SANbox-8/16 Switch Management

User's Manual

Sun StorEdge SAN 3.0 Release

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Preface

How to Use This Manual

This manual has five sections, an appendix, a glossary, and an Index:

- Section 1 explains how to cable a Management Station to a Switch chassis and configure its Ethernet port.
- Section 2 explains how to start and run the SANsurfer Switch management application.
- Appendix A contains information about Counter names and their functions.

Please use this manual in conjunction with the appropriate Switch Installer's/ User's manual. These manuals are listed in the Related Materials paragraphs later in this section.

Making Changes

Making changes to any window will not affect switch operation until the changes are applied by pressing the Apply toolbar button. Changes made on any window that are not applied will be ignored when the window is exited.

Intended Audience

This manual introduces Switch management products and explains their installation and use. It is intended for users competent in installing and using network management tools.

The figures used in this manual show the 16_port switch but the functions described herein are identical for the 8_port switch.

Related Materials

The following manuals are referenced in the text and/or provide additional information.

- SANbox-16 Fibre Channel Switch Installer's/User's Manual, Publications Number 875-3142-10.
- SANbox-8 Fibre Channel Switch Installer's/User's Manual, Publication Number 875-3141-10.

Switch Files Stored On The Management Station

During application installation and operation, the following files are accessed and stored on the management station:

- app.dat — file which contains the user administration information
- *.cfg — configuration information about the switch. This file is only created if a fabric is archived. This file will be used for a fabric restore.
- *.tpl & *.tp2 — zoning template information about each switch in the fabric. This is only created if the template is saved by the application.
- *.fab — fabric information from the fabric window. A file (other than the default.fab file) is only created if the user creates a file and saves current information.

Section 1 Switch Set-up

Switch Preparation

Before managing a fabric, you must acquire and set the IP address of the switch. You can set the IP address in the following ways:

- RARP (preferred method)
- SANsurfer

NOTE:
The current firmware does not support TFTP as in previous versions.

Ethernet Cabling

The Switch is managed through the use of a customer-supplied management station connected to the Switch via its Ethernet port.

Refer to Figure 1-1 for the location of the Ethernet port on the back of the 16_Port Switch. Refer to Figure 1-2 for the location of the Ethernet port on the back of the 8_Port switch. Figure 1-3 shows the Switch Management connector and the cable wiring. The Ethernet connection may be made with power applied to the Switch.

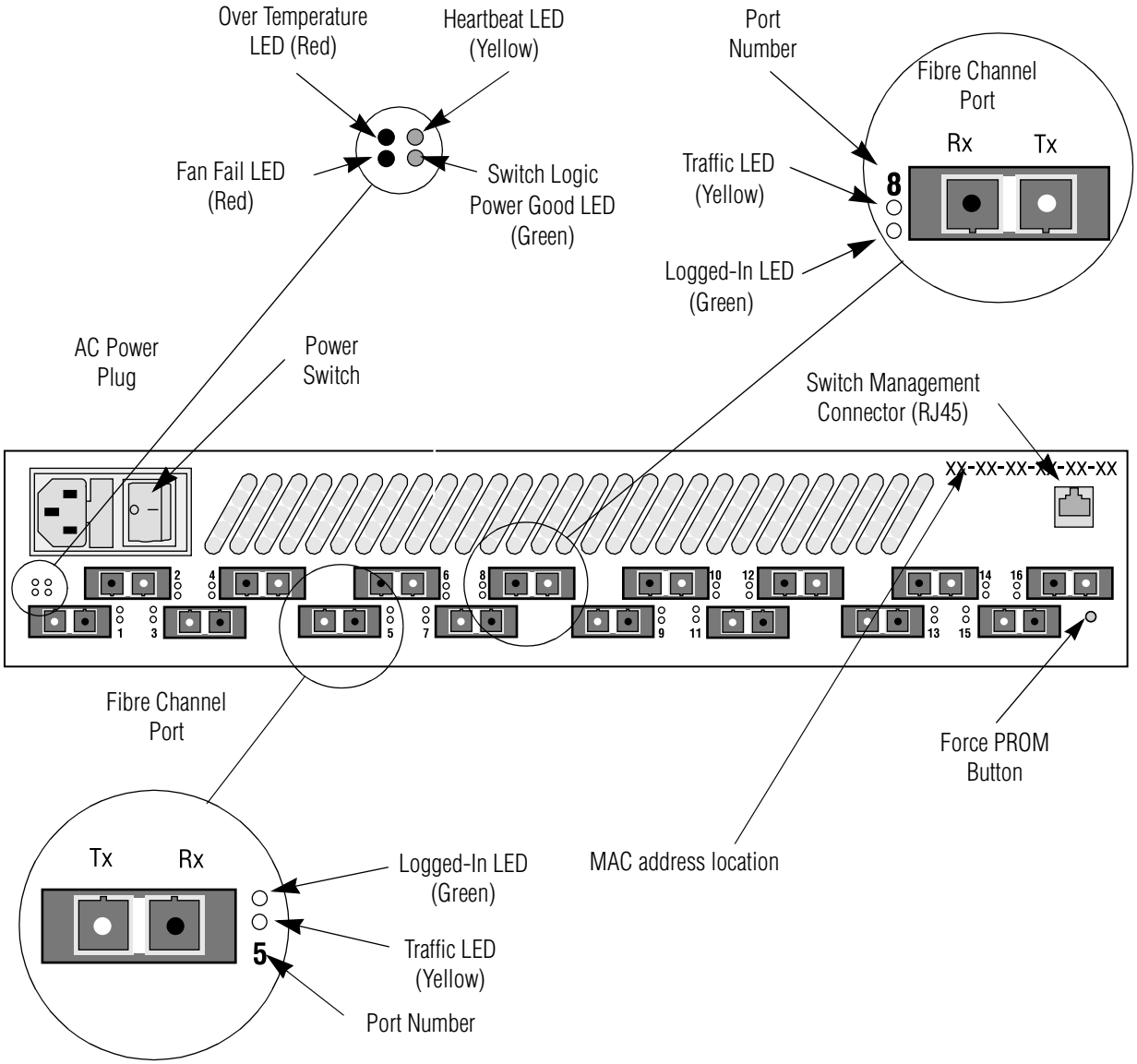


Figure 1-1 Chassis Back (16_port Switch)

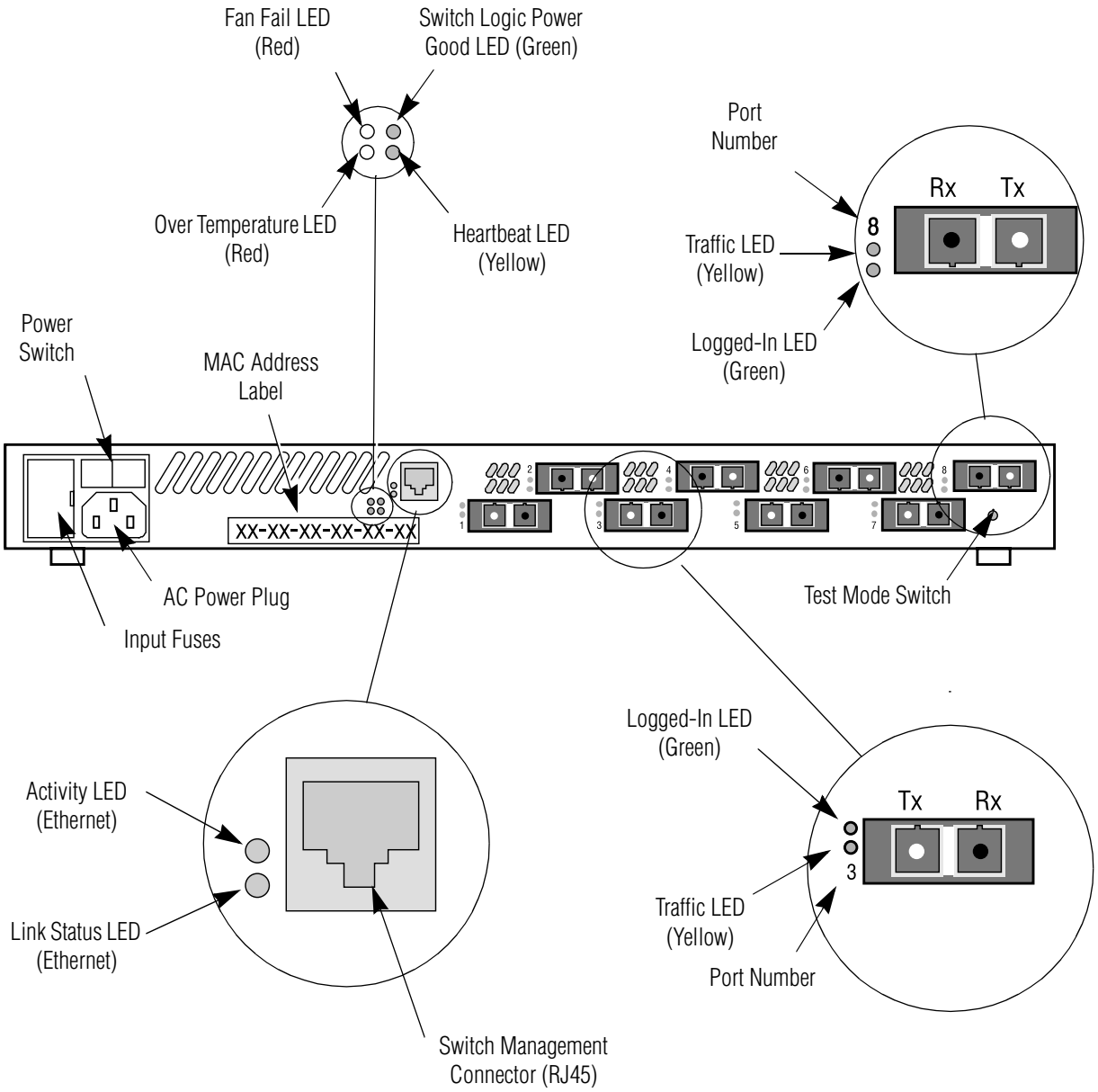
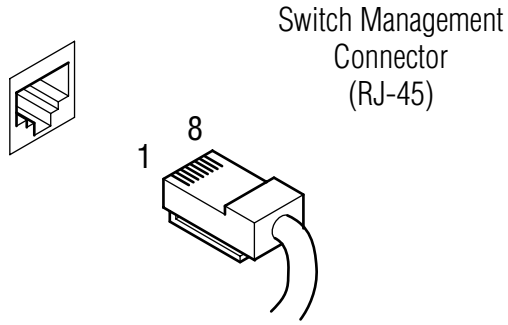


Figure 1-2 Chassis Back (8_port switch)



10/100BASE-T
Straight TP
Connection

Ethernet Switch Management Connector
to
Repeater, Ethernet Switch or Hub
Straight TP Connection

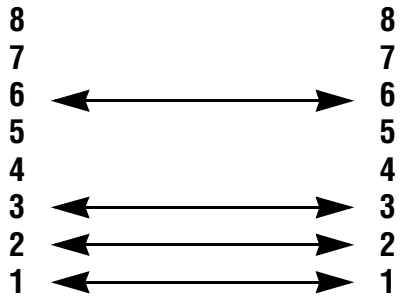


Figure 1-3 Ethernet Cable Wiring Diagram

Configuring the Switch Ethernet Port

Configuring a Switch ethernet port requires changing the IP Address stored on the Switch. If the existing IP Address is known, it is possible to modify it using a number of different methods described in this section.

Configuring the Ethernet Port Using RARP

RARP can be used for the following conditions:

- Configuring the IP Address of a new switch
- Configuring the IP Address of a switch with an unknown IP Address

When a switch is powered up, it will receive the IP Address and switch name information from the management station to which it is connected. It is necessary to modify several files on the management station to account for this information. Prior to configuring the ethernet port, it is necessary to determine the following:

- IP Address to be used by this switch (needed in step 3 below)
- MAC Address of the switch (refer to Figure 1-1 for location of MAC Address) (needed in step 2 below)
- A switch name defined by the switch user (needed in steps 2 & 3 below).

After the items above have been obtained, perform the following steps at the management station that will be used to control these switches:

1. Determine if the /etc/ethers file exists:

   # ls /etc/ethers

   If the ethers file is not found, skip the remainder of this step and proceed to step 2. If the file is found, create the /etc/ethers.SAV backup file:

   # cp -p /etc/ethers /etc/ethers.SAV

2. Backup the affected management station configuration files:

   # cp -p /etc/nsswitch.conf /etc/nsswitch.conf.SAV
   # cp -p /etc/hosts /etc/hosts.SAV

3. Edit (or create if none exists) the /etc/ethers file to add the following line to the end of the file:

   <switch MAC address> <switch name>

   As an example:
   00:c0:dd:00:61:c0 switch_1

4. Edit the /etc/hosts file to add the following line:

   <switch IP address> <switch name>

5. Edit the /etc/nsswitch.conf file to modify the ethers and hosts lines so that the word “files” appears before the [NOTFOUND=return] portion of the line, as shown below.

   hosts: nis files [NOTFOUND=return]
   ethers: nis files [NOTFOUND=return]

6. Determine if the RARP daemon is running by typing:

   # ps -eaf | grep rarpd *(NOTE: The vertical line is the pipe character)*

   If the RARP daemon is running, proceed to step 8.

7. Start the RARP daemon in the Solaris software environment by typing:

   # /usr/sbin/in.rarpd -ad

8. Turn the power switch off, and then back on to reset the switch chassis and activate the new IP address.

9. Verify that the IP address is correct:

   # ping <*switch IP address*>

10. If the RARP daemon was started in step 7, return to the window in which the daemon was activated. Perform Control-C key sequence to stop the daemon operation.

Configuring the Ethernet Port Using SANsurfer

The SANsurfer application is based on **Java 1.3.02**. Ensure that the management station has this version, or higher, JRE installed. The SANsurfer application operates on the Solaris 2.8 (build 4) platforms.

NOTE:
If a previous version of the SANsurfer application was installed, perform the uninstall procedure prior to installing the current version of SANsurfer.

To verify the version of the installed SANsurfer application:

To obtain the version information for the installed SANsurfer application, enter the following:

/usr/opt/SUNWsmgr/bin/esm_smgr -version

To install SANsurfer:

To install SANsurfer for the first time on a workstation, do the following:

1. Go to the directory which contains the SUNWsmgr file.
2. Type:

   # pkgadd -d SUNWsmgr
3. Respond 'Yes ' to all questions, or press the Enter key to accept the default.

To upgrade the SANsurfer application, do the following:

1. Preserve the current user administration and fabric configurations. Copy the current user administration file (app.dat) and fabric information file (default.fab) elsewhere on the management station.
2. Go to the directory which contains the SUNWsmgr file and enter the following:

   # patchadd <new-patch>

   Respond 'Yes' to all questions, or press the Enter key to accept the default answers.
3. Replace the new app.dat and default.fab files with the files you saved in step 1.
4. Type the following to start the application:

   # /usr/opt/SUNWsmgr/bin/esm_smgr

NOTE:
It will be necessary to install the firmware which is to be used with this version of the application in each switch of the fabric. See "Load Flash" on page 2-59.

To Activate SANsurfer to Modify a Switch IP Address

SANsurfer can be used to change a known IP Address. If the IP Address is unknown, use another application to change it on the Switch.

1. Activate the SANsurfer application by typing:

   # /usr/opt/SUNWsmgr/bin/esm_smgr
2. If this is the first time this switch is being logged into, or if no username and password file has been created by a super user, the application will go to the User Administration window after the login information is entered. Log in to SANsurfer using the username and password shown in Table 1-1. Otherwise, use the username and password assigned during a previous session.

Table 1-1 Default Username and Password

Password File (app.dat)	
Default Username	**Default Password**
su	**su**

3. When the Fabric window opens, set up a fabric using the current switch IP Address for the Switch being changed.
4. Double click on the status box; observe that the Topology window opens.
5. Double click on the Ethernet Port icon next to the switch icon, or double click on the Fabric Name field to open the Network window.
6. Highlight the IP Address box and enter the new IP Address.
7. Press the Apply button to save the change.
8. Press the Back button to return to the Topology window; then double click on the switch icon to enter the Faceplate display. Select Special>Reset to reset the switch.
9. When the switch is reset, if a new IP Address was assigned, the IP Address entered into the Fabric window is now incorrect. Return to the Fabric window (by repeated pressing of the Back button), delete the existing fabric, and re-enter the fabric using the new IP Address. Press Apply.
10. Double click on the Status field icon. The Topology window opens. Double click on the Ethernet Port icon next to the switch icon to go to the Network Configuration window.
11. Verify that the IP Address information and any other changes have been applied.
12. Exit the SANsurfer application.

Section 2 SANsurfer Switch Management

Overview

If the SANsurfer application has not previously been loaded on the management station, refer to "To install SANsurfer:" on page 1-7.

NOTE:
The SANsurfer Switch management application is able to manage a variety of Switch products. Although only images of 16_port switches are used, the application functions identically for 8_port switches. This section describes the functions of the application. The application "grays-out" or doesn't display functions that do not pertain to the selected Switch chassis.

SANsurfer allows you to:

- Manage fabrics
- Select a fabric and set up the connection to the Ethernet port on the Switch chassis through which the selected fabric is managed
- Configure the Switch Management interface with its IP network configuration parameters
- For a fabric which contains multiple Switch chassis, view the topology of the selected fabric including the T_Port connections between chassis
- View the fabric Ethernet connection
- View hardware and firmware version information for the selected chassis
- View Switch Names and World Wide Names (WWNs) of all chassis
- View port addresses on the selected chassis
- View T_Port interconnections and their port addresses
- Configure chassis parameters such as:
  - Switch Name
  - Chassis Number
  - Stage Type for multi-stage Switch fabrics
  - Administration Mode (Online or Offline)

- View dynamic graphs that display performance data for each On Line port on the selected chassis. The performance data is only recorded during the time period when an application window that monitors the performance data is open. When the monitoring window is closed, the recording of performance data stops. Performance data includes:
  - Frames In
  - Frames Out
  - Frames Dropped
  - Errors
- Record statistics such as data rate and errors and save the data in files presented in a tabular format that are compatible with spreadsheets, but are viewable by any text editor or word processor.
- View Node Name data for each device connected to the selected chassis
- Perform Trace operations to follow selected operations through the selected chassis
- Read and write memory locations on the selected chassis
- Update the Flash memory on the selected chassis
- Divide the fabric ports into zones for more efficient and secure communication among functionally grouped nodes. There are several types of zones and a port may be defined in several of them simultaneously.
  - Hard Zones:

    Hard Zones can be comprised of individual ports from a number of switches. Communications will only occur between ports in the defined hard zone. As many as 16 hard zones may be defined in a single fabric.
  - Broadcast Zones allow the division of the fabric into as many as 16 zones that define the area of Broadcasts. A particular port may be placed in one or more of these Broadcast Zones. A port will broadcast to all ports in the same Broadcast Zone (or zones) in-which the port is defined. If Hard Zones are enabled, Broadcast Zones will not communicate across Hard Zone boundaries.
  - Name Server zones allow the division of the fabric into as many as 256 zones that define which port or device will receive Name Server information. A particular port or device may be defined in one or more of these Name Server Zones. If Hard Zones are enabled, Name Server Zones will not communicate across Hard Zone boundaries.

Name Server Port Zones will receive Node Name information for all ports in the same Name Server Zone (or zones) in-which the port is defined.

- Broadcast Zones and Name Server Zones may overlap.
- SL_port Zones allow the division of the fabric into as many as 256 zones that define which ports will communicate with each other. SL Zones can be comprised of individual ports from a number of switches. Communications will only occur between ports in the defined SL zone.

- Configure the Mode of each port on the selected chassis by right clicking on the GBIC from any switch faceplate window or from the View drop down menu. Port Modes include:
  - F_Port (Port forced to be an F_Port)
  - Fabric Port (Port allowed to self-configure as a Public Loop port or an F_Port)
  - SL_Port (Port forced to be a Private Segmented Loop port)
  - Offline (Port forced off line)
  - TL_Port (Port forced to be a Private Translated Loop port)
- Tune any port on the selected chassis to the multi-frame-sequence (MFS) characteristics of the particular host bus adapter
- View the type of GBIC installed in each port on the selected chassis
- View statistics for each port on the selected chassis
- View Address and Logged-In status of each Loop Device connected to any port on the selected chassis
- Configure Loop Devices including:
  - Re-initializing the loop
  - Enable all devices on the loop
- Archive all configurable chassis parameters for all the chassis in a fabric
- Restore all configurable chassis parameters for all chassis in a fabric by using the archived configuration
- Provide Name Server WWN data fabric-wide.

Activate the SANsurfer Application

NOTE:
It is possible to manage a fabric using SANsurfer from more than one management workstation at one time. However, making changes simultaneously from more than one management workstation is discouraged. Though some information is updated in real time among SANsurfer sessions, configurable parameters are not, which could result in conflicting changes.

If the application is not currently loaded on the management station, refer to Section 1 for instruction in loading the application. Once the application has been loaded, start the application by typing:

```
# /usr/opt/SUNWsmgr/bin/esm_smgr
```

The SANsurfer application opens.

NOTE:
During login, the application compares the current fabric status with the most recent fabric status stored on the switch. If the two status profiles are not the same, a message about needing fabric rediscovery will be displayed. To correct the problem and prevent the message from being displayed each time you access the fabric, go to the topology window and press the Apply button to save the current topology to the switch.

Set-Up or Open a Fabric

If no fabric has been set up, use the Fabric window to name a new fabric and indicate the IP Address of the chassis which is accessible through an Ethernet port. Refer to the Fabric window for details of setting up a fabric.

To open a known fabric directly from a command line prompt, use the following command:

/usr/opt/SUNWsmgr/bin/esm_smgr <IP address>

If a fabric has been defined, use the Fabric window to open it. Double click the icon for the fabric (or select the icon and use the Zoom button) and the application will display the Topology window for the fabric. The Topology window is described later in this section.

Adding a Switch to a Fabric

To successfully add a switch to a fabric, the following must be true about the new switch:

- The firmware on the new switch must be of the same version family as the other switches in the fabric. If the fabric uses version 3.04.xx, so must the new switch.

NOTE:
To verify the firmware version, open the Topology window and double click the switch icon to open the Switch Faceplate display. The firmware version (or Flash) is displayed in the upper right corner of the Switch Faceplate display.

- Fabric ID must be the same as the other switches in the fabric. The fabric ID cannot be modified directly. If for some reason a new switch has a different fabric ID, you must restore the factory defaults. Select Special>Default Config from Switch Faceplate Display to restore factory default settings.
- The Chassis ID must be unique among the other switches in the fabric. The default value of 1 should be changed after connection to ensure that when another switch is added to the fabric, a conflict does not arise from a duplicate number.

NOTE:
After adding the switch to the fabric, be sure to change the default chassis ID to a unique value within the fabric between 1 and 63.

Use the SANsurfer application to verify these conditions on switches which have previously been connected to other fabrics or as a single switch fabric prior to connecting them to this fabric. If the switch has never been used, these conditions have been met by the default states. The switch is ready for installation in the fabric.

Removing a Switch from a Fabric

To prepare a switch for removal from a fabric, it is necessary to change certain settings to specific values to ensure that the switch is in a known condition for the next time it is to be used.

- On the Network Configuration window, if the IP Address, Netmask Address, and Gateway Address values were changed to reflect the current fabric, change them back to the default values (unless permanently assigned):

  IP Address: 10.0.0.1

  Netmask Address: 255.0.0.0 (must be on the same subnet)

  Gateway Address: 0.0.0.0

- In the Zoning Window, clear all zones (Hard, Name server, Broadcast, Segmented Loop).
- On the Faceplate Display window,
  - Ensure that the Chassis ID is set to 1.
  - Ensure that the Stage Type is set to SL Zoning Mode.

Deleting a Switch from the Topology Window

Deleting a switch from the topology window requires that the switch be physically removed from the fabric by powering down the switch or disconnecting all T_Ports from that switch. Then the switch may be selected in the topology window and tool bar delete button pressed. The switch and the T_Port link will be removed.

If the switch was disconnected from the fabric by powering down, when the switch is again powered up, the application will detect its presence in the fabric and display it on the topology window.

Understanding Application Windows

SANsurfer is composed of a set of windows. Each window manages a different aspect of Switch/fabric configuration.

- The first window displayed following login is the Fabric window. The Fabric window allows you to create, name, and choose a fabric.
- Choose a fabric. The application displays the Topology window. From the Topology window, choose any icon and, depending on the cursor location on the icon when clicking, the application displays the window that applies to that area of the icon. Refer to the paragraphs concerning the Topology window for further information.

For Switches:

- The Switch Faceplate Display is composed of a Faceplate portion, a Chassis Parameters/Switch Statistics portion, and a Chassis Management portion (see Figure 2-1 on page 2-9 to identify these locations). The Faceplate portion may control any of the following for the selected Switch chassis:
  - Ethernet connection enters the Network Configuration window
  - Port States (default)
  - Port Modes
  - Port Tuning
- The Chassis Parameters/Switch Statistics portion of the Switch Faceplate display allows assigning or modifying:
  - Chassis ID
  - Administrative State (Admin Mode)
- The Chassis Management portion of the window may control/view any of the following for the selected Switch chassis:
  - Performance (default)
  - Node Name
  - Trace (only to be used at the direction of your authorized maintenance provider)
  - Memory Map (only to be used at the direction of your authorized maintenance provider)
- Information is only updated in the active window. Moving to another window will make that the active window.

For Faceplates:

- Tables and lists allow highlighting individual rows to aid in visual separation from other rows. Clicking in the header row of the table or list clears the highlighting.
- Allows changing the displayed information through use of menu selections.
- Previous and Next buttons allow stepping between individual items of the selected type without having to backtrack to a previous screen.

Application Overview

Switch management relies on viewing many switch functions through the use of a switch faceplate display (see Figure 2-1).

Movement through the application will involve changing displays, depending on the desired activity. The application records the screens movements. Movement between different screens is accomplished as shown in Figure 2-2. To determine where the application will move when the Back button is pressed, retrace the line from the location that was exited to reach the current location.

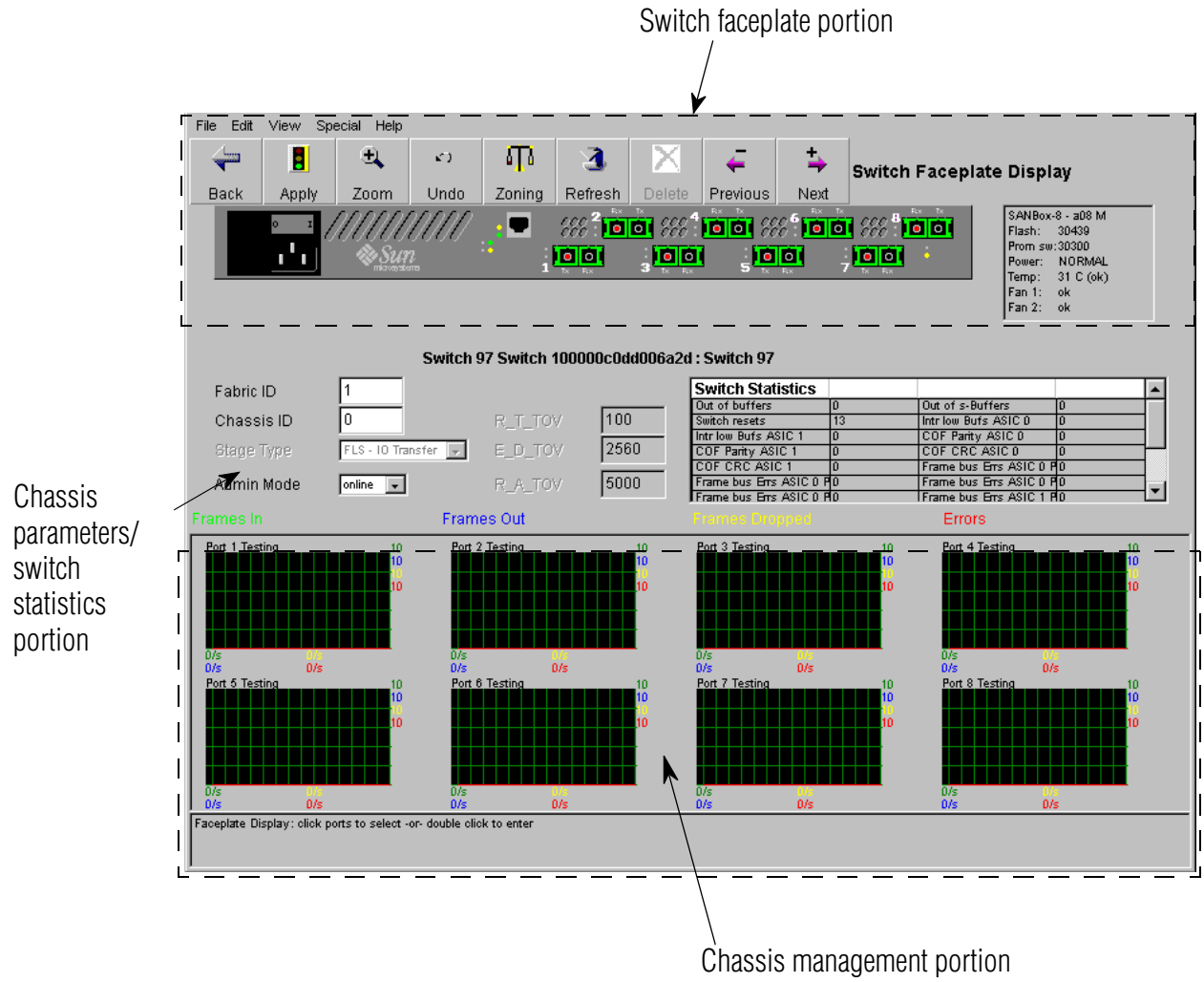


Figure 2-1 Faceplate Display Identification

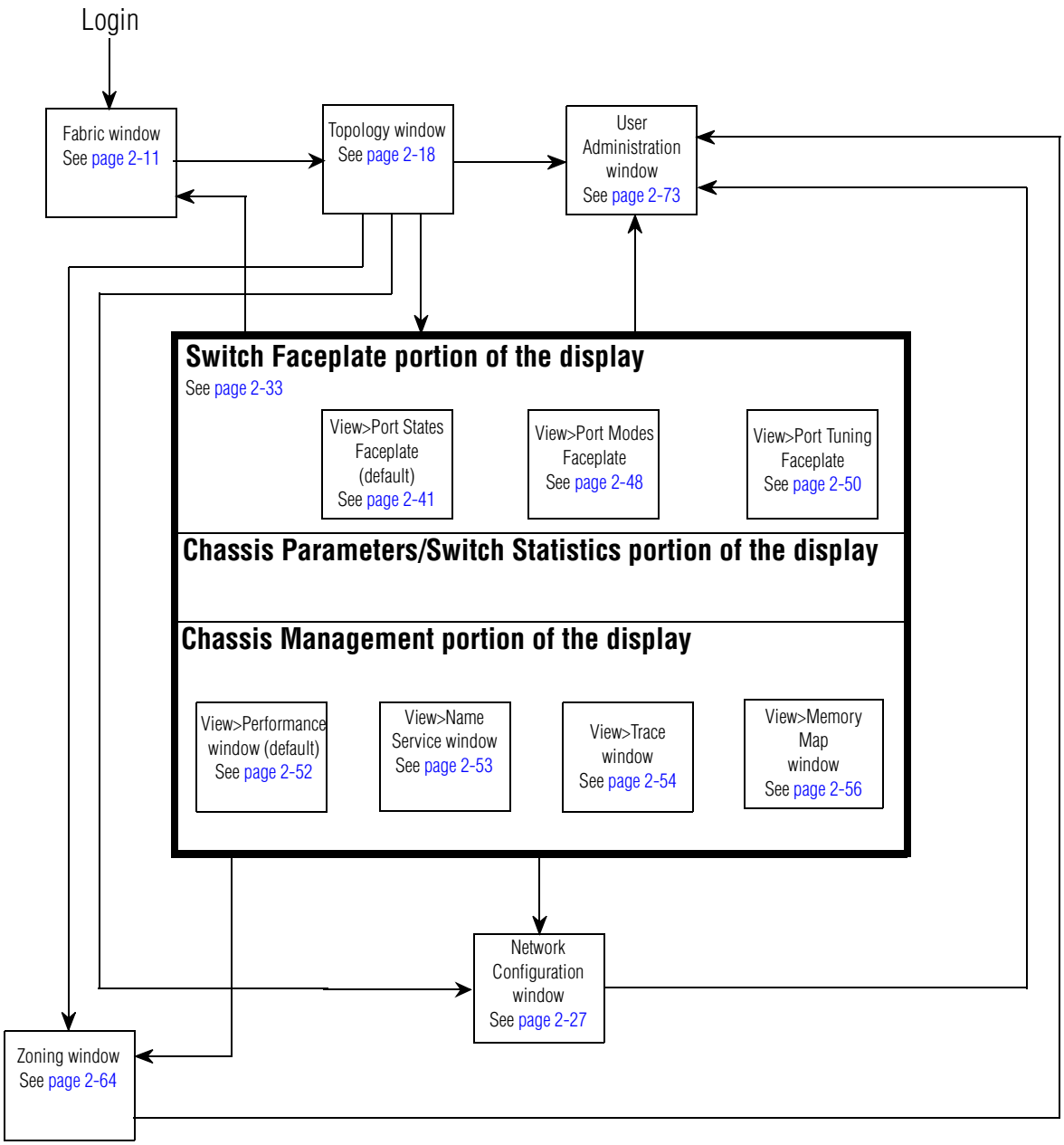


Figure 2-2 SANsurfer Switch Management Application Block Diagram

Fabric Window

The Fabric window (see Figure 2-3) allows any user to select a fabric for observation and/or management (depending on the authority of the user). Each managed fabric has a name and an Ethernet connection to a Switch chassis through which the fabric is managed, hereafter referred to as the Fabric Management Switch. SANsurfer chooses one Ethernet connection at a time to use.

The Fabric window is the first window displayed after entering the application. The table allows a user to define an entry to the fabric with the IP address of the Fabric Management Switch.

The application loads the default.fab file (or the file assigned to a user; see "User Administration Window" on page 2-73 for assigning alternate files), which contains an entry for the managed fabric if the fabric was saved in a previous session. If this is the first time the application is being accessed, there is no defined fabric.

The default.fab file does not contain a fabric unless a fabric has been defined and saved to the default.fab file by a user. If each user has saved their own user.fab (where user = a user-defined name) file, and the user administration table lists that fab file for that user, the fabric shown will be different for each user. For example, if user "Tom" has saved his defined fabric in the "tom.fab" file, changing the entry in the user administration window for "Tom" to use the tom.fab file instead of default.fab will recall Tom's fabric in the Fabric window when he signs in to the application.

Use the Network Configuration Window to assign the IP Address to this Switch chassis. The Fabric window can also be used to record Port, Switch chassis, and Fabric statistics through the use of the type and mode fields.

NOTE:
Only one fabric may be displayed on the fabric table. To create a new fabric, an existing fabric must be deleted.

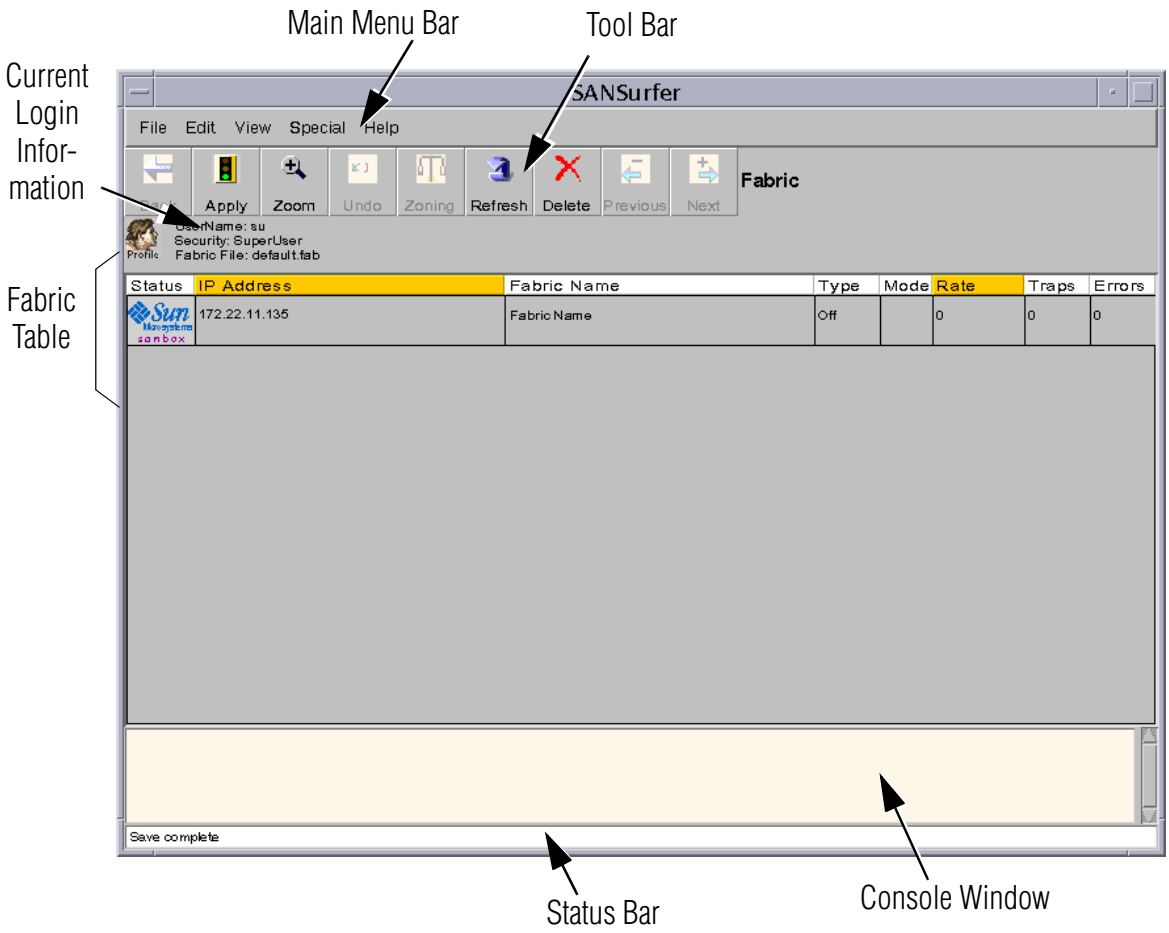


Figure 2-3 Fabric Window

Entering this Window

After starting the application, this window is displayed. Return here from subsequent displays by repeatedly pressing the back button or by using the View>Return to Fabric Screen command from any faceplate window.

Current Login Information

The current login information portion of the window contains information about the current user, their level of authority, and the fabric file being used. Click on this information to go to the user file. Only a super user can view and save changes to the user file.

Creating or Deleting a Fabric

To create a new fabric:

- Place the cursor in the IP Address field and type the IP Address of the Switch connected via Ethernet to the management station.

- Tab once to go to the Rate field. Enter a value of zero (do not log errors), or a value greater than or equal to 20 (errors logged).
- When the cursor is removed from the Fabric Line after completing the IP Address and Rate value, a Status Icon will appear.

To delete an existing fabric:

- Select the fabric line on the table.
- Press Delete to remove the existing entry.

Select and View a Fabric on the List

When selecting a fabric, the application will go to the Topology window.

To select and view a fabric on the list:

- Double click on the Status Icon for the fabric.
- Single click on the Status Icon field, then press the Zoom button.
- Single click on the Status Icon, then choose View>Zoom In.

Fabric Line in Fabric Table

The Fabric Line contains the IP Address and Fabric Name of the managed fabric. Fields display status information. These are the Status field, Traps field, and Errors field. The Type, Mode, and Rate fields are for recording status information.

Status Field

The Status Field may contain either of two icons: A Sun icon or a PROM icon.

Sun Icon

When a Fabric Line in the list contains a complete entry (Fabric Name and an IP Address), the application displays a Sun icon in the Status field. The application uses the background color of the Sun icon to indicate fabric status:

- Gray indicates normal operation.
- Red indicates loss of communication with one or more switches in the fabric.
- Yellow indicates the occurrence of fabric errors.

If the status icon for the fabric is red, this could be the result of the IP address not matching the value entered in the list. If the IP address is different, the entry must be deleted and a new entry created.

NOTE:
If the icon remains red after the IP address is entered, verify that the following conditions exist:

- The switch has power applied and is turned on
- The ethernet cable is attached to the switch
- The IP address entered in the table is the same as the IP address of the switch

NOTE:
If a dialog box appears indicating that the SANsurfer application has detected a fabric change that requires topology rediscovery, along with a no reply with switch message in the bottom of the window (Sunlog appears red), clicking OK should return the Sun Logo to normal operating mode (gray).

Double click the Sun icon and the application will display the Topology window for the fabric. A delay of up to 40 seconds for the Topology display to appear is normal. The Topology window can also be displayed by single clicking on the Sun Icon to select the fabric and then pressing the Zoom button or choosing View>Zoom In.

PROM Icon

The icon with the word “PROM” displayed in the Status field is not an indication of normal operation. It is only visible as a result of Power-On-Self-Test (POST) failure or when the switch has been placed in the Force PROM mode.

When a Switch chassis has a Flash Checksum error as a result of a POST diagnostic or if the chassis was placed into Force PROM mode via its Test Switch, the Switch chassis goes into PROM Mode and uses its default IP Address to communicate through its Ethernet port. This requires connection of an Ethernet crossover cable directly to the Switch chassis and use of the default IP Address to connect to it. When you communicate with this Switch, designate an IP Address of 10.0.0.1. When SANsurfer connects to this Switch, it will find that it is in PROM Mode and display the PROM Icon. When a Switch is in PROM mode, there is a very limited number of things that can be done to it. New control code can be loaded into Flash memory or give the Switch a new IP Address.

For details on what can be done while in the force PROM mode, refer to document 875-3142-10 (SANbox-16 Fibre Channel Switch Installer’s/User’s

Manual) or document 875-3141-10 (SANbox-8 Fibre Channel Switch Installer's/User's Manual).

IP Address Field

The IP Address field contains the IP Address for one Fabric Management Switch. Enter an IP Address by placing the cursor in the IP Address field and typing.

Fabric Name

The Fabric Name is taken from the SNMP Name field of the Network Configuration window. Edit an existing name by double clicking in the Fabric Name Field and being taken to the Network Configuration window. Change the name as desired from there. Press Apply to save the changes before returning to this window.

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and Help. These menus are context-dependent. That is, they each may contain different sub-menus depending on the window they are in.

File

The File Menu contains the following sub menus:

- Open Fabrics — Opens an Open File dialog box. Select the fabric (.fab) file to open.
- Save Fabrics — Save the current fabric entry IP address and fabric status to the file specified in the User Administration screen, Fabric Name field, for the logged in user.
- Save Fabrics as — Opens a Save As dialog box. Name the new fabric file that will contain the currently-defined list of fabrics.
- Delete Fabrics File — Opens a Delete dialog box. Select one fabric file to delete. DO NOT delete any xxxxxxx.fab files which are referenced on the User Administration window. The fabric file which is opened when the SANsurfer application is started is defined on the User Administration window for each defined user. If the specified file is not present at the time of log in, the application will not function.
- Security Login — Exit from current user and log in as another.
- Exit — Exit the SANsurfer application.

Edit

The Edit Menu contains the following sub menu:

- User Administration — Go to the "User Administration Window" on page 2-73

View

The View Menu contains the following sub menus:

- Zoom In — Same as Zoom Button.
- Zoom Out — Not used
- Return to Fabric Screen — Not used

Special

The Special menu contains the following sub-menus.

- Clear Messages — Clears the console window portion of the Fabric window.
- Clear Counters — Clears the statistics counters in the selected fabric.

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Tool Bar

Four Tool Bar buttons are active in the window: Apply, Zoom, Refresh, and Delete.

Apply Button

Apply is a context-dependent button. That is, its operation changes somewhat depending on the Window it is in. Press Apply to cause the Switch to use the new information.

If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Zoom Button

Zoom is a context-dependent button. That is, its operation changes somewhat depending on the Window it is in.

In the Fabric window, the Zoom button opens the Topology window.

Refresh Button

Refresh is a context-dependent button. That is, its operation changes somewhat depending on the Window it is in. In the Fabric window it does the following:

- The Refresh button causes the application to check the fabric to see if its status has changed. If it has, the application changes the color of the fabric Status field icon accordingly.

- The Refresh button scans all Switch chassis within the fabric to find all ports that are logged in.

Delete Button

The Delete button removes the selected fabric line from the list of fabrics. If no fabric line is selected, the button has no effect. Press the Apply Button to save the change.

Topology Window

Refer to Figure 2-4. Entering the Topology window polls the fabric and displays its topology. Switch Chassis icons appear in a rack icon and represent each Switch chassis in the fabric that is powered-on, able to communicate, and not in PROM mode. The bottom of each rack icon displays the fabric address or name assigned to that switch. If a chassis name is given (in one of the Switch Faceplate displays) the name replaces the fabric address line. Lines between Switch Chassis icons indicate one or more T_Port links between chassis.

Single-click a Switch Chassis icon, the rack or switch name line, the Ethernet connection, or a GBIC to select it. The application displays information for the selected object in the column at the left side of the window.

Entering this Window

Enter this window from the Fabric window. Return here from subsequent windows by repeatedly pressing the Back button.

Topology of Selected Fabric

The Topology window displays a diagram of the fabric. The display shows the Ethernet connection next to the Fabric Management Switch. Each Switch Chassis is shown in a rack with the switch Chassis name or assigned fabric address and T_Port Links between chassis.

Ethernet Connection

The window shows the active Ethernet connection on the Fabric Management Switch. If the application loses its ability to communicate with the Ethernet connection it displays the ethernet connection in Red.

Single-click on the Ethernet connection to select it. The Ethernet Connection turns Blue when selected. The Ethernet information displays at the left side of the window for the selected Ethernet connection.

Double-click on the Ethernet Connection to go to the Network Configuration window.

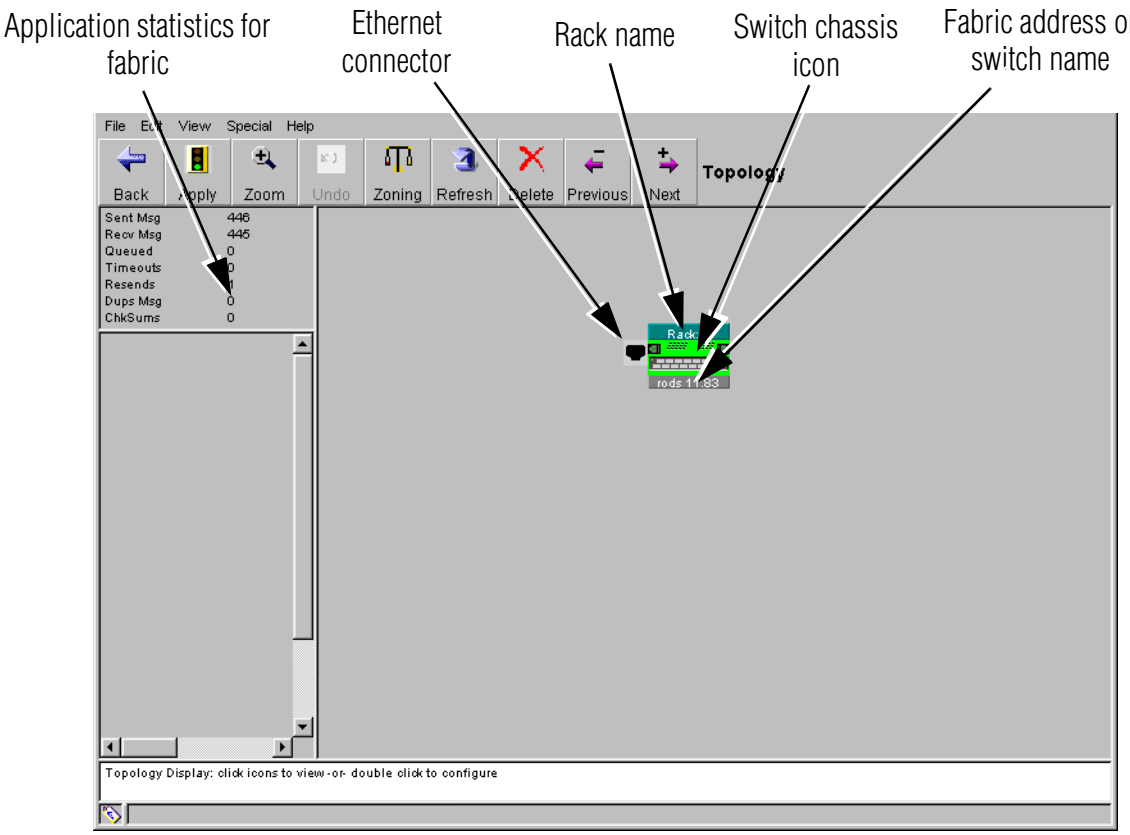


Figure 2-4 Topology Window

Switch Chassis Icon

The application uses colors to identify various states of the Switch chassis. The colors are:

Red The application has lost its ability to communicate with a Switch chassis.

Green The chassis is an IO/T chassis.

Blue The chassis has been selected.

Violet The switch has been selected, but the application is unable to communicate with it.

Single-click on the Switch Chassis icon to select it. The Switch Chassis icon changes to blue, indicating selection. The information display at the left side of the window contains assigned ports for the selected Switch chassis along with their GBIC type. Single clicking on a GBIC will display information relating to that item.

Re-arrange the chassis in the Topology window by click-dragging the chassis icon to any position in the window. Any T_Port connections to other chassis remain

connected. Dragging switch icons on top of each other will combine the contents of both switches to reside within a single rack. To separate the icons, delete one of the switches.

Double-click on the Switch Chassis icon to jump to the Switch Faceplate window.

T_Port Link

The window shows a line between chassis to represent at least one T_Port Link between chassis. If the application loses its ability to find a T_Port Link it displays that T_Port Link in Red.

Single-click a T_Port Link to select it. The application changes the color of the line to Blue when selected. The information display at the left side of the window will show detailed T_Port Link information for the selected link.

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and Help. These menus are context-dependent. That is, they each may contain different sub-menus depending on the window they are in.

File

Except that the Open Fabrics command is not available, the File Menu contains the same sub menus as the Fabric window (descriptions of these sub menus can be found on page 2-15).

Edit

The Edit Menu contains the following sub menu:

- User Administration — Go to "User Administration Window" on page 2-73.

View

The View Menu contains three sub menus:

- Zoom In — Same as Zoom Button.
- Zoom Out — Same as Back button.
- Return to Fabric Screen — Return to the Fabric window

Special

The Special Menu contains the following sub menus:

- Toggle Beacon — Cause the Heartbeat LED on the selected chassis to blink at a very rapid rate and the application displays a small blinking beacon icon. This is useful when you want to locate a particular physical chassis installed at a location which contains multiple switches. Toggle the beacon to On, a small red blinking icon appears to the right side of the switch icon. The physical Heartbeat LED on the selected chassis changes from the normal blink rate and blinks at a very fast rate. The Heartbeat LED will continue to

operate in this state until it is changed back. The blink rate is not automatically changed back when the application is exited. When the beacon icon is blinking, selecting the toggle beacon command removes the small red blinking icon on the topology window and returns the physical LED on the selected chassis to the normal heartbeat pattern.

If no switch is selected, the fabric management switch is selected by default.

- Archive Fabric — Allow administrators to save fabric/switch configurations to a local file. The archive file can then be used via the Restore Fabric option to reprogram all switches back to a known configuration. Archives can also be used to program new switches for deploying identical configurations.

  When saving the archive, a standard file dialog will appear asking for the name & location to save the archive file. SANsurfer will then retrieve all the configurable parameters from each switch in the fabric and save that information to the archive. Saved parameters include operational switch parameters, port modes (MFS/testing/TL, etc.), zoning (excluding descriptions), Network, and SNMP configurations. Neither Fabric IDs nor Chassis IDs are saved in the archive.

  For an example of the archive/restore operation, refer to "Network Configuration Window" on page 2-27.

- Restore Fabric — Restore from the file created with the Archive Fabric command. This can be used to restore the configuration of a fabric/switch to a known state or to program new fabrics/switches to a common configuration. If the fabric was not archived before a switch failure within the fabric, it will not be possible to restore the fabric with this command.

  Restore opens a standard file dialog box for locating the archive file. It then compares the archive configuration to the current fabric. Any switches that can't be identified must be manually mapped to the archive. This will determine which configuration will be assigned to each switch. SANsurfer polls each switch in the fabric and compares it to the stored configuration. If there are differences, SANsurfer will recommend reprogramming the modified switches. After the fabric has been reprogrammed, you must manually reset (or reset through the faceplate menu) each switch in the fabric before the modifications will take effect.

  For an example of the archive/restore operation, refer to "Network Configuration Window" on page 2-27.

- Topology Refresh — Perform a manual refresh of the topology and save the information to the fabric file.

- Select Zoning Method — Not available

- Change Stage Type — Use this command to access the windows affirming that the stage type of the switch is to be changed.

NOTE:
Changing the stage type is a disruptive event. When the stage type is changed on one switch, all switches within the fabric are changed to the same stage type. The stage type change will cause each switch to be reset. After the reset, the display returns to the fabric window.

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Tool Bar

Back Button

Press Back to go to the window nearer to the start of the application.

Apply Button

Press Apply to cause the Switch to use the new information. A dialog box will state that the new information has been saved in the Switch Flash memory.

If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Zoom Button

Press the Zoom button to jump to the Faceplate window when a Switch Chassis icon is selected.

Press the Zoom button to jump to the Network Configuration window when the Ethernet connection is selected.

Undo Button

Inactive

Zoning Button

Press the Zoning Button to jump to the Zoning window.

Refresh Button

The application polls the fabric every 10 seconds and whenever you press the Refresh Button and refreshes the data in this window.

Delete Button

If you have physically removed a Switch chassis and its T_Port Links from the selected fabric, the application will not be able to find them and will display them in Red. To remove them from the Topology window, select the Switch Chassis icon and press Delete. This removes them from the window. Press the Apply Button to save the change.

Previous Button

Inactive

Next Button

Inactive

Performing an Archive/Restore of a Fabric

For the archive/restore function to modify the replacement switch properly, the archive file must have been created prior to the switch failure.

NOTE:
If the restore file used on the current fabric is not the information which was created from this fabric, the IP information which is restored to this fabric will be that of switches used to create the archive file, in use in another fabric. Using an archive file from another fabric might result in duplicate IP information.

This procedure assumes that the failed switch is not the Fabric Management Switch.

If the failed switch is the Fabric Management Switch, it is desirable to access the fabric from an alternate ethernet connection within the fabric to reconfigure the replacement switch.

If an alternate fabric Ethernet entry point is not available, or if this is a single switch fabric, it will be necessary to connect the management station directly to the new switch with the crossover ethernet cable. It will also be necessary to configure the Fabric window to access the switch using RARP or the default IP address (10.0.0.1). Refer to "Configuring the Switch Ethernet Port" on page 1-5 for more information.

NOTE:
A replacement switch must be an exact replacement of the switch being removed. A 16_port must replace a 16_port, and an 8_port must replace an 8_port.

---

1. At the failed switch:
    a. Turn off the power and disconnect the AC cord(s).

b. Note port locations and remove the interconnection cables and GBICs.

c. Remove the failed switch.

2. At the replacement switch:

   a. Mount the switch in the location where the failed switch was removed.

   b. Install the GBICs and cables removed from the failed switch in the same port locations.

   c. Attach the AC cord(s) and turn on one (if more than one present) power supply.

3. Open the Topology window for the fabric. The failed switch and the replacement switch will both appear on the topology screen (refer to Figure 2-5).

4. On the tool bar, press the Delete button. The fabric will now show only usable switches (refer to Figure 2-6).

5. Select Special>Restore Fabric.

6. Select the file which was created with the desired fabric archive. A dialog box opens (refer to Figure 2-7).

7. Using the drop-down list of fabric switches for the unassigned switch, select the switch which was replaced.

8. Click OK and when asked, allow reprogramming of the Switch.

9. Reset the replacement switch.

10. The replacement switch has now been assigned the parameters which had been in place for the failed switch.

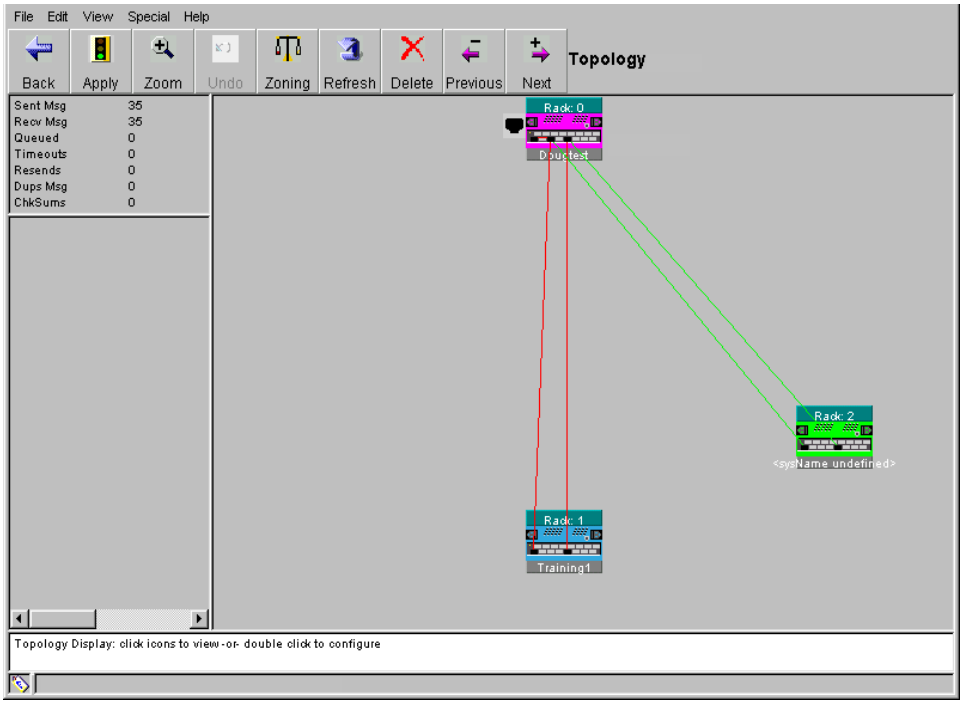


Figure 2-5 Fabric with Failed and Replacement Switches

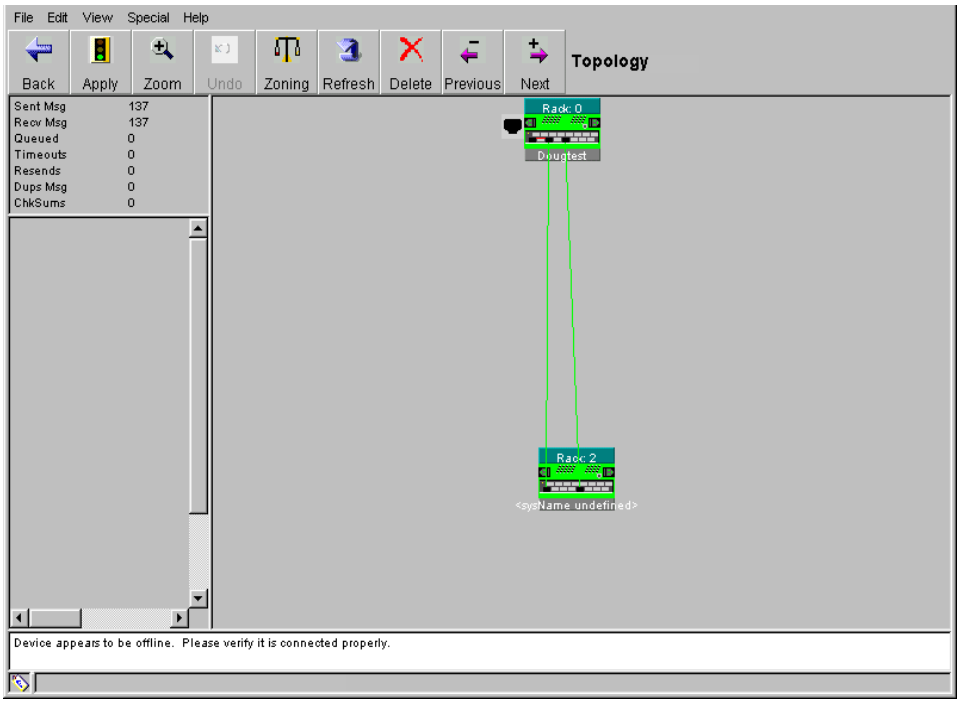
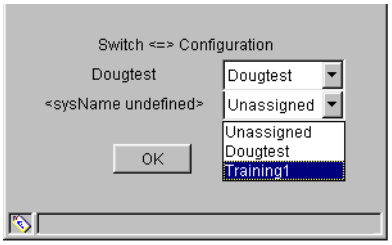


Figure 2-6 Failed Switch Removed



NOTE: Switch names will reflect names assigned in your fabric.

Figure 2-7 Restore Dialog Box

Inconsistent Object

If the application detects a change which invalidates its view of the fabric, the application may need to rediscover the fabric. As a result, the following will occur:

- An error message about the need for rediscovery is displayed
- The offending switch is deleted from the topology display
- The application returns to the fabric window
- The application queries all fabric switches to discover current configuration.

After rediscovery, go to the topology window and press the Apply button

Network Configuration Window

Refer to Figure 2-8. Use the Network Configuration window to configure the Ethernet Port of the selected Switch.

The management workstation maintains the ARP table, which maps a switch's IP address to its MAC address. When the application enters the Network Configuration window, it queries the switch for its network configuration settings. If there is an entry in the ARP table with the same IP address, changes you make to the switch network configuration will not be saved until you clear the matching entry from the ARP table.

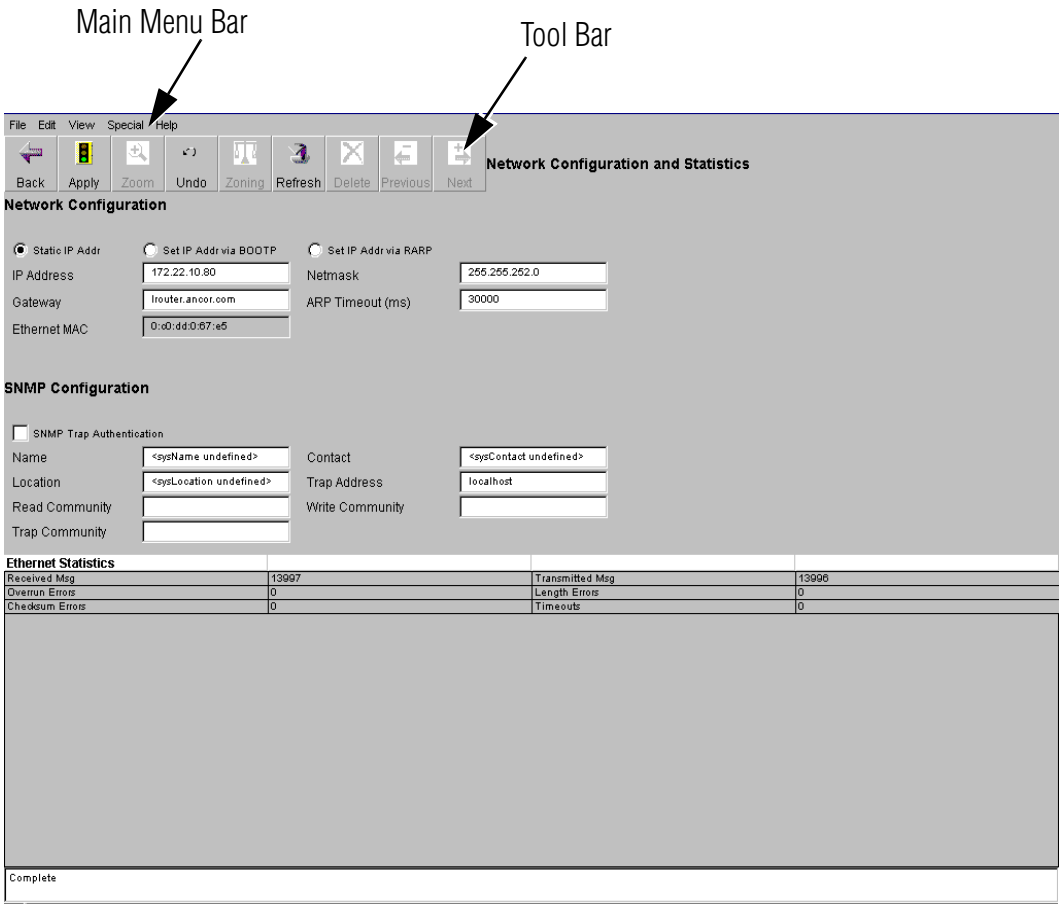


Figure 2-8 Network Configuration Window

Entering this Window

You may enter this window from:

- the Topology window, or from the Switch Faceplate window by either double-clicking the Ethernet Connection or by selecting the Ethernet Connection and pressing Zoom
- the Switch Faceplate window by double-clicking the Ethernet icon
- the Fabric window by double-clicking on the Name field for a defined fabric.

Network Configuration

The Network Configuration area of the window contains fields for configuring the Ethernet connection to the selected Switch.

Static IP Addr Radio Button

This tells the switch to use the IP Address stored in the Flash Memory.

Set IP Addr via BOOTP Radio Button

This tells the Switch to attempt to use BootP the next time it initializes. If no BootP server responds, the Switch will use the values in the saved configuration.

Set IP Addr via RARP Radio Button

Selecting the RARP radio button causes the switch to use RARP the next time it initializes. The switch queries the network using the RARP protocol for an IP address:

- If an RARP server does not respond, the switch reverts to it's stored IP address or the default (10.0.0.1) if no IP address is configured.
- If an RARP server responds with an IP address, the switch saves the address returned in non-volatile memory.

The RARP protocol does not provide a gateway address or a netmask. Refer to "Gateway" on page 2-30 for information about specifying a gateway address. The switch calculates a netmask based on the address class of the discovered IP address:

- For Class A IP addresses, the calculated netmask is 255.0.0.0
- For Class B IP addresses, the calculated netmask is 255.255.0.0.
- For Class C IP addresses, the calculated netmask is 255.255.255.0

The calulated netmask is not sufficient when subnets are used. If you are using subnets, do the following after the switch has obtained an address through RARP:

1. Using a host on the same subnet as the switch, use the SANsurfer application to change the netmask to match the subnet.

2. Disable RARP either by turning off the Set IP Addr via RARP radio button, or removing the MAC address from the RARP server. This prevents the switch from rediscovering it's IP address and recalculating the netmask on a subsequent reset.

IP Address

NOTE:
After you change a switch's IP address, its old IP address entry (10.0.0.1 for example) and MAC address remain in the ARP table. If you configure another switch with the same IP address (10.0.0.1), the ARP table will not overwrite the old MAC address with the new one. Therefore, be sure to clear the old IP address in the ARP table to allow another switch to be configured with that IP address.

The IP Address box displays the current IP Address of the Switch Management port. The default set at the factory is 10.0.0.1. To modify this field, move the cursor to the field and type. Write the contents of this field to the Switch Flash memory by pressing the Apply Button. The application will ask whether to Reset the Switch. If no is chosen, the Apply will still write the new address to Flash but will not Reset the Switch. The Switch will start using the new IP Address when it is Reset. If yes is chosen, the Switch will Reset and start using the new IP Address. At this point contact with the Switch chassis is lost. Return to the Fabric window and use the new IP Address to communicate with this chassis.

If other changes are to be made in this window, make them before changing the IP Address and be sure to write the IP Address down. Then use the Fabric window to change the IP Address used by the management application.

Netmask

The Netmask field displays the current Subnet Mask of the Switch Management port. The default set at the factory is 255.0.0.0. To modify this field, move the cursor to the field and type the new data. Write the contents of this field to the Switch Flash memory by pressing the Apply Button. The application will ask whether to Reset the Switch. If no is chosen, the Apply will still write the new address to Flash but will not Reset the Switch. The Switch will start using the new Subnet Mask when it is Reset. If yes is chosen, the Switch will Reset and start using the new Subnet Mask.

NOTE:

- If you misconfigure the entry and lose communication with the Switch, the Switch must be placed in the Force PROM mode. This forces the use of the default IP Address, Subnet Mask and Gateway Address. Then go back to the Configuring the Switch Ethernet Port paragraphs near the beginning of this section and start over.
- RARP calculates its own netmask which cannot be changed. Refer to "Set IP Addr via RARP Radio Button" on page 2-28 for more information.

Gateway

The Gateway box displays the IP Address of the Gateway (if any) used by the Switch Management port. The default set at the factory is 0.0.0.0. Modify this field by moving the cursor to the field and typing. Write the contents of this field to the Switch Flash memory by pressing the Apply Button. The application will ask if the Switch is to by reset. If no is chosen, the Apply will still write the new address to Flash but will not Reset the Switch. The Switch will start using the new Gateway Address when it is Reset. If yes is chosen, the Switch will Reset and start using the new Gateway Address.

ARP Timeout

This value is in hundredths of a second (.00). The default set at the factory is 30000 (300.00 seconds). To modify this field, move the cursor to the field and type the new value.Write the contents of this field to the Switch by pressing the Apply Button.

Ethernet MAC

The Ethernet MAC field is read-only and displays the MAC Address of the Switch's Ethernet port.

SNMP Configuration

Use the SNMP Configuration area of this screen to read, modify, or write the Switch Management SNMP switch name, contact person, and Switch location.

SNMP Trap Authentication Check Box

Check this box to send a trap to the address in the Trap IP Address field in the event that an attempt is made to access the Switch with the wrong Community Names.

Name

The Name field displays the Name of the switch. The default set at the factory is undefined. To modify this field, move the cursor to the field and type the new data, up to 64 characters in length. Write the contents of this field to the Switch Flash

memory by pressing the Apply Button. The Switch will start using the new information immediately.

Contact

The Contact field contains the Name of the Contact person. The default set at the factory is undefined. To modify this field, move the cursor to the field and type the new data, up to 64 characters in length. Write the contents of this field to the Switch Flash memory by pressing the Apply Button. The Switch will start using the new information immediately.

Location

The Location field contains the location of the Switch. The default set at the factory is undefined. To modify this field, move the cursor to the field and type the new data, up to 64 characters in length. Write the contents of this field to the Switch Flash memory by pressing the Apply Button. The Switch will start using the new information immediately.

Trap Address

This field contains the address used by Authentication Traps. The default set at the factory is 127.0.0.1. This is the "Loopback" address (the address that the Switch uses to send things to itself) therefore, if you don't modify this address, Authentication Traps will not go anywhere. To modify this field, move the cursor to the field and type the new address. Write the contents of this field to the Switch by pressing the Apply Button.

Read Community (currently unused)

Write Community (currently unused)

Trap Community (currently unused)

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and Help. These menus are context-dependent. That is, they each may contain different sub-menus depending on which window is displayed.

File

The File Menu contains the same sub menus as the Fabric window (descriptions of these sub menus can be found on page 2-15).

Edit

The Edit Menu contains the following sub menu:

- User Administration — Go to the User Administration window (refer to page 2-73)

View

The View Menu contains the following sub menus:

- Zoom In — Same as Zoom Button.
- Zoom Out — Same as Back button.
- Return to Fabric Screen — Return to the Fabric window

Special

No entries.

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Tool Bar

The Tool Bar buttons that are active in this window are Back, Apply, Undo, and Refresh.

Back Button

Press Back to go to the Topology window or the Switch Faceplate Display window.

Apply Button

Press Apply to cause the Switch to use the new information. A dialog box will ask whether to save the new information in the Switch Flash memory. If the information requires a Switch Reset operation in order to take effect, the application will ask whether to perform it now.

If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Undo Button

Press Undo to ignore all changes made to this window since the last Apply operation.

Refresh Button

Press the Refresh button to poll the Switch. The application places the current settings in all fields.

Switch Faceplate Display

Refer to Figure 2-9. The Switch Faceplate display is composed of three main parts which represent the selected chassis: Faceplate, Chassis Parameters/Switch Statistics, and Chassis Management area.

This window is the central point for managing the selected chassis. For example, Faceplate selections under the View menu allow you to view and control Port States and Modes and if the chassis is a SANbox, it also allows you to configure the chassis for Multi-Frame-Sequences (MFS). In the Chassis Parameters area, you can view chassis parameters such as various Fibre Channel timeouts, Stage Type, and the chassis' Administrative Mode. Using selections in the View menu allow you to use the Chassis Management area to view chassis performance and Node Name information, set-up and run Traces, and view and change Switch chassis memory. The Chassis Management area displays activity graphs for active ports. While the display is visible, the graphs are updated. If the display is closed, the updating stops.

Selections in the Special menu allow you to update flash memory, toggle the heartbeat LED to aid in locating the switch, restore a saved configuration, revert to the default configuration, zero port counters, and reset the switch.

This document covers the following main areas of the Switch Faceplate display:

- Main Menu Bar (refer to page 2-35)
- Tool Bar (refer to page 2-37)
- Port States Faceplate (refer to page 2-41)
- Port Modes Faceplate (refer to page 2-48)

NOTE:
Port modes can be set from any faceplate screen by right clicking a port on the faceplate.

- Port Tuning Faceplate (refer to page 2-51)
- Chassis Parameters (refer to page 2-38)
- Performance Data (refer to page 2-52)
- Node Name (refer to page 2-53)
- Trace Log (refer to page 2-53) (use only when directed by your authorized maintenance provider)
- Memory Map (refer to page 2-55) (use only when directed by your authorized maintenance provider)
- Flash Load (refer to page 2-57)

- Switch reset (refer to page 2-60)

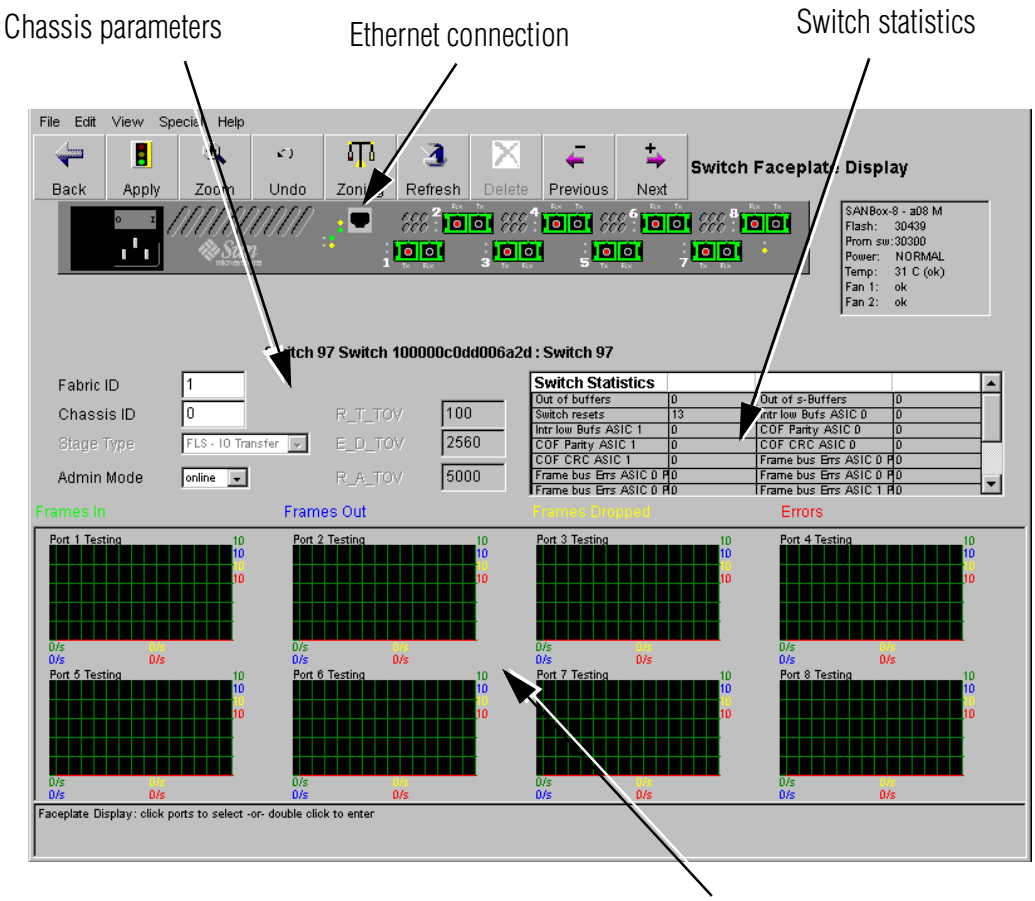


Figure 2-9 Switch Faceplate Display

Entering this Window

Enter this window from the Topology window by double clicking on the switch icon.

The chassis displayed in the Switch Faceplate display represents the selected chassis. The default display is the Port States Faceplate and the Performance information in the Chassis Management portion of the window. The application displays the Chassis Parameters with all Chassis Management selections.

Ethernet Connector Icon

Double click the icon to go to the Network window.

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and help. These menus are context-dependent. That is, they each may contain different sub-menus depending on the window they are in. The Main Menu Bar and all its sub-menus are the same for all Faceplate window combinations.

File

Except that the Open Fabrics entry is not available from this window, the File Menu is the same as the Fabric window (descriptions of these sub menus can be found on page 2-15).

Edit

The Edit Menu has the following sub menu:

- User Administration — Go to the User Administration window (refer to page 2-73)

View

The View Menu contains the following sub menus:

- Zoom In — Same as Zoom Button.
- Zoom Out — Same as Back button.
- Return to Fabric Screen — Return to the Fabric window
- Performance (Default) —Displays performance data for each active port on the selected chassis. Refer to "Switch Faceplate Display (View>Port States) (Default)" on page 2-41.
- Node Name — Displays Node name data for each active port on the selected chassis. Refer to "Switch Faceplate Display (View>Node Name)" on page 2-53.
- Trace Log — (Only to be used at the direction of your authorized maintenance provider) Allows you to set-up and run Trace operations on the selected chassis. Refer to "Switch Faceplate Display (View>Trace Log)" on page 2-54.
- System Log — Not currently used
- Memory Map — (Only to be used at the direction of your authorized maintenance provider) Displays the contents of the switch memory. Refer to "Trace Overview" on page 2-55.

- Port States (Default) — Displays the Port States Faceplate. Refer to "Switch Faceplate Display (View>Port States) (Default)" on page 2-41.
- Port Tuning — Allows you to change the characteristics of the individual port to match the connected host bus adapter. Refer to "Switch Faceplate Display (View>Port Tuning)" on page 2-50.
- Port Modes — F, fabric, SL, TL, Offline. When F and fabric ports are connected by ISL to another switch, their mode will change to T_Port. Refer to "Switch Faceplate Display (View>Port Modes)" on page 2-49.

Special

The Special Menu has the following sub-menus.

- Update Flash — Allows loading new code into the Flash memory of the selected chassis. Refer to "Load Flash" on page 2-59.
- Toggle Beacon — Cause the Heartbeat LED on the selected chassis to blink at a very rapid rate and the application displays a small blinking beacon icon. This is useful when you want to make sure that a particular physical chassis installed at a location which contains multiple switches. Toggle the beacon to On, a small red blinking icon appears over the heartbeat LED dot on the faceplate icon. The physical Heartbeat LED on the selected chassis changes from the normal blink rate and blinks at a very fast rate. The Heartbeat LED will continue to operate in this state until it is changed back. The blink rate is not automatically changed back when the application is exited. When the beacon icon is blinking, selecting the toggle beacon command removes the small red blinking icon on the faceplate window and returns the physical LED on the selected chassis to the normal heartbeat pattern.
- Restore Saved Config — Commands the selected Switch chassis to revert from an applied configuration to the latest configuration saved. When you Apply configuration changes to the Switch chassis it does not save the configuration unless the fabric is archived. The following configuration parameters are saved:
  - Chassis number
  - Stage type
  - Chassis admin mode
  - Port administrative stat
  - Loop arbitration
  - MFS tuning
  - R_T_TOV

  - E_D_TOV
  - R_A_TOV
  - MFS_TOV
- Default Config — Commands the selected Switch chassis to revert to the following default configuration settings:.
  - Chassis ID: 1
  - Stage type: IOT
  - Chassis administrative mode: Online
  - Port administrative state: Online
  - Loop arbitration: Enabled
  - MFS tuning: Normal
  - R_T_TOV: 50 milliseconds
  - E_D_TOV: 1280 milliseconds
  - R_A_TOV: 2500 milliseconds
  - MFS_TOV: 320 milliseconds
- Zero Port Counts — Zero Port Counts causes all counters in the Switch Statistics table (except for the resets field) to be zeroed.
- Clear Zoning Backup —Inactive
- Reset — Allows you to perform a Reset operation on the selected Switch chassis. Refer to the Update Flash and Reset paragraphs later in this section.

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Tool Bar

Except for Delete, all Tool Bar buttons are active in this window.

Back Button

Press Back to go to the Topology window.

Apply Button

Press Apply to cause the Switch to use the new information. A dialog box will ask whether to save the new information in the Switch Flash memory.

If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Zoom Button

If a GBIC icon is selected, press the Zoom button to jump to the Port Information window.

Undo Button

Press Undo to ignore all changes made to this window since the last Apply operation.

Zoning Button

Press the Zoning Button to jump to the Zoning window.

Refresh Button

Press the Refresh button to poll the Switch. The application places the current switch settings in all displayed fields.

Previous Button

Press Previous to move to another switch in this fabric (order determined by the application).

Next Button

Press Next to move to another switch in this fabric (order determined by the application).

Chassis Parameters

The Chassis Parameters area of the Switch Faceplate display allows assigning or modifying the Chassis ID and the Administrative State for the chassis.

Chassis ID Field

The Chassis ID represents bits 19 through 14 of the 24-bit Fibre Channel Address. The Chassis ID is in the range of 01-63 and identifies a particular chassis within a multi-chassis fabric. Switches come from the factory with a Chassis ID of 1 and must be assigned a unique value for the fabric in which it will be connected.

NOTE:
If a Chassis ID of a switch has the same value as another switch in the fabric, only one of the two switches will appear on the Topology window and the Logged-in LED on the connection port(s) between the switches will blink rapidly.

Press the Apply button to apply the Chassis number to the chassis.

Stage Type

This window reflects the current stage type. To change the stage type, refer to the topology window, Special menu, Change Stage Type command.

Cascade and Mesh Fabrics

In a cascade fabric, switches are connected together forming a larger fabric. In these fabrics, all switches are IO/T switches. Some ports are used as Input-Output fabric ports that connect to users, and some ports are used as T_ports that interconnect the switches.

There are two switch stage types: IO/T and SL private loop. Private loops dedicate all fabric switches to exclusive communication between private initiators and targets on the same loop and do not allow any attached switches to function as an IO/T.

- FLS IO Transfer (IO/T) — IO/T switches provide Input-Output fabric ports that connect to users and also Transfer ports that connect the switch to other switches in a fabric.
- SL Private Loop— The SL private loop stage type forces all ports to be SL_Ports configured in one SL_Port Zone. That is, all SL_Ports share the same set of AL_PAs. Private Loop also allows these SL_Port switches to be connected together in a Cascade topology. The maximum number of SL_Ports in this one SL_Port Zone is 32.

Admin Mode

The Administration Mode is the state of the chassis as determined by this screen. Choose one of the following:

- online — The switch is available for normal operation.
- offline — The switch is not available. This can be used, for example, in the event of an error, to remove a switch from a fabric without having to disconnect it or shut it off.

Press the Apply button to apply the mode to the chassis.

R_T_TOV

The R_T_OV field controls the Receiver_Transmitter_Timeout value for all ports on the chassis.

This value can not be altered from the default.

E_D_TOV

The E_D_TOV field controls the Error_Detect_Timeout value for all ports on the chassis.

This value can not be altered from the default.

R_A_TOV

The R_A_TOV field controls the Resource_Allocation_Timeout value for all ports on the selected chassis.

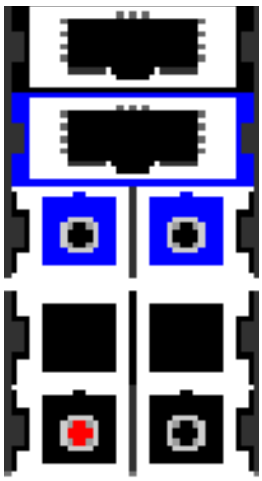
This value can not be altered from the default.

Switch Statistics

The switch statistics change to reflect events that have occurred since the counters were zeroed. The Switch Resets counter is the total number of times this switch has been reset since it was manufactured and this value is not cleared when the counters are zeroed.

Switch Faceplate Display (View>Port States) (Default)

The Port States Faceplate is the default faceplate in the Switch Faceplate display. It displays icons which represent the kind of GBIC installed in each port on the selected chassis. Figure 2-10 shows the GBIC icons. If no GBIC is installed in a particular port, the faceplate shows a blank for that port.



DB9/HSS DC passive Copper (Module definition 1)
Black and White

DB9/HSS DC active Copper (Module definition 2)
(Black and White with a Blue border around the White)

Optical LW single mode (Module definition 3 and 6)
(Blue with Black dots)

Optical OFC
(Black)

Optical SW multimode (Module definition 5 and 7)
(Black with Red and Black dots)

Figure 2-10 GBIC Icons

Double-click on a GBIC icon to jump to the Port Display/Loop Devices window for that port. Single-click to select a GBIC icon and Zoom to the Port Display/ Loop Devices window.

Double-click the Ethernet port icon to jump to the Network Configuration window.

GBIC Icon Colors

While connected to a switch, the GBIC icons for the switch will be color-coded to represent their status. The status colors are:

- Green — port operation is normal
- Red — port is offline or an error exists
- Blue — port is selected for viewing; click zoom button or double click icon
- Gray — port is inactive

Switch Faceplate Display (Port Display/Loop Devices)

The Port Display window displays statistics for the selected port and, if the selected port is a loop port (FL, SL, or TL_Port), the window also displays information about each device on the loop and allows control of these devices. Figure 2-11 shows the window as it would appear for a loop port. If the selected port was not a loop port the application will display only the Switch port statistics portion of the window.

The Previous and Next buttons will move through active ports on this switch until the first/last port is reached. When the first/last port has been reached, that button will no longer function and a warning message is displayed that the port limit has been reached.

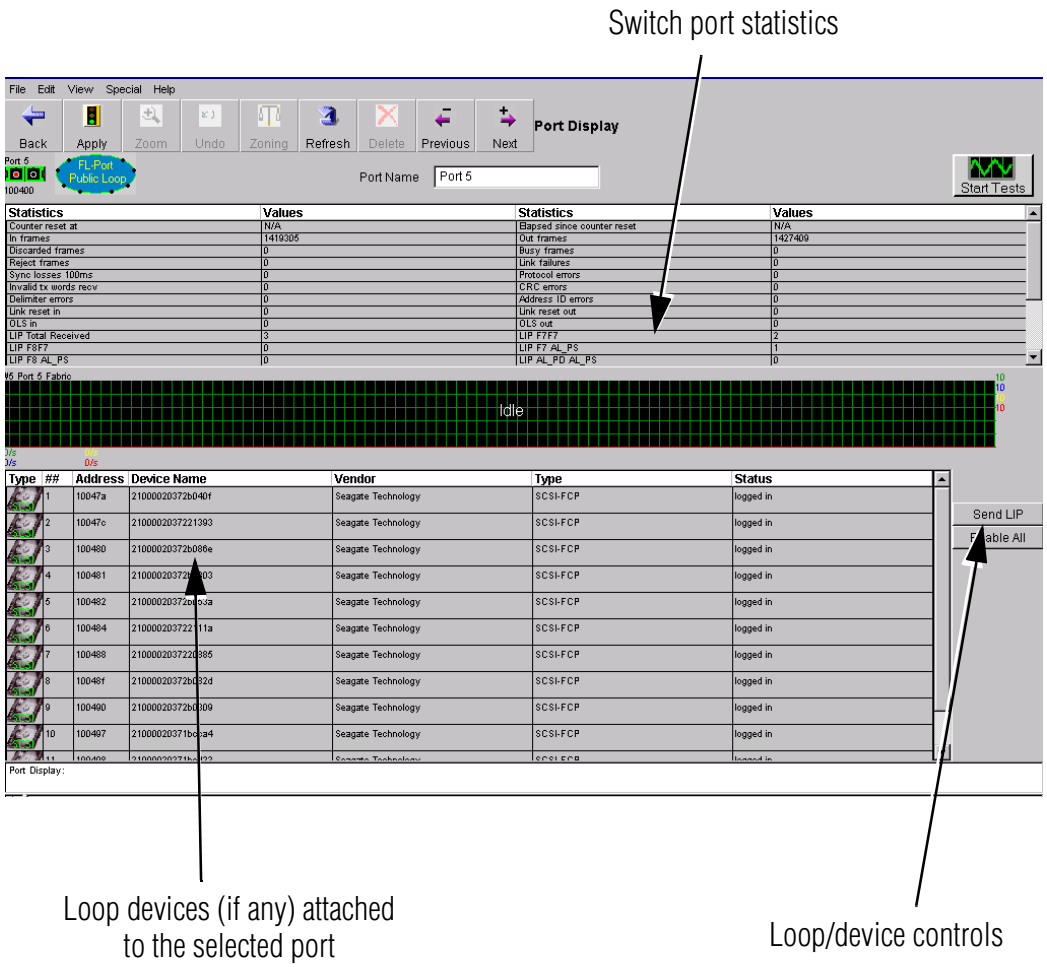


Figure 2-11 Port Display/Loop Devices Window

Entering the Port Display/Loop Devices Window

Double-click on a GBIC icon in the Switch Faceplate display to jump to the Port Display for that port or click on the performance chart of the desired port. You may also single-click to select a GBIC icon and Zoom to this window for the selected port.

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and Help. These menus are context-dependent. That is, they each may contain different sub-menus depending on the window they are in.

File

The File Menu contains the same sub menus as the Fabric window (descriptions of these sub menus can be found on page 2-15):

Edit

The Edit Menu contains the following sub menu:

- User Administration — Go to the "User Administration Window" on page 2-73.

View

The View Menu contains two sub menus:

- Zoom In — Same as Zoom Button.
- Zoom Out — Same as Back button.
- Return to Fabric Screen — Return to the Fabric window
- TL Configuration — Not available
- Loop Devices — Not available

Special

The Special Menu contains the following sub menus:

- Reset Counts — Reset the values of all counters displayed on the statistics portion of the faceplate display.
- Reset TL Mappings — Not available

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Port Name

The Port Name box is provided to allow naming each port.

NOTE:
If the port name is changed, the Apply button must be pressed in this window, and in the Topology window.

Start Tests Button

The Start Tests button opens the window shown in Figure 2-12. Enter the desired values for test duration. If the parameters entered are achieved, the port will have passed. If errors are encountered, having the Stop on error box checked will cause the test to terminate. If the Stop on error box is not checked, the test will re-initiate in an attempt to complete testing within the defined values.

After testing is initiated, the Start Tests button changes to the Stop Tests button. Pressing the Stop Tests button halts the testing without completing the test.

NOTE:

- While the test is running, the faceplate window may not be exited. To exit the faceplate window, allow the test to complete, or press the Stop Tests button to terminate the test.
- An F_Port may fail the port test because the HBA does not support the Echo command. When this occurs, the following message is displayed:

```
Failure may be a result of this port not supporting loop
back test functionality.
```

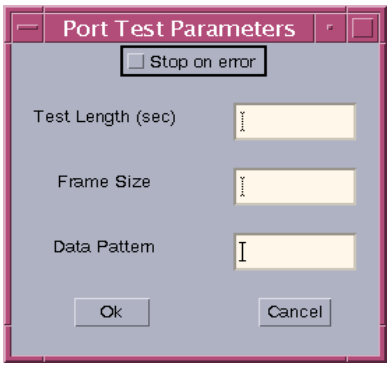


Figure 2-12 Port Test Parameters Window

Stop on error

When checked, the test will terminate when any error is encountered. If unchecked, the test will attempt to re-start to perform to the values defined in this window. If checked and no error is encountered, the test will terminate when the entered values have been reached.

Test Length (sec)

The value is a number in the range of 0 to 2^{64}/1000 seconds. Entering a value that exceeds the allowable range, the test will not be performed.

Frame Size

The frame size is a numeric value in the range of 36 to 2148. Entering a value that exceeds the allowable range, produces an error message explaining the valid range of values.

Data Pattern

The data pattern is the test value to be used for testing the port. The value is an eight byte hexidecimal value, in the range of 00000000 to FFFFFFFF. Enter the eight byte value in hexidecimal. Entering a value that exceeds the allowable range, causes the minimum or maximum allowable value to be entered.

Port Statistics

The application displays the Port Statistics and Performance for the selected port. The application updates this information every five seconds or when Refresh is pressed.

Loop Controls

Press Refresh to observe changes made to any of the control commands. The Loop Controls are described in Table 2-1.

Table 2-1 Loop Controls Field Descriptions

Control	Description
Send LIP	Press this button send one LIP on a private loop. A LIP will cause all devices on the loop to perform a log in with the loop.
Enable All	Press this button to enable all the devices on the loop that can be enabled. Mechanical failures would prevent a loop device from being enabled.

Loop Devices

The Loop Devices portion of the window has an entry for each device on the loop. Each entry is described in Table 2-2. Press Refresh to update this portion of the window.

Table 2-2 Loop Display Field Descriptions

Field	Description
Type	An icon symbolizing the device on the loop (Public or Private)
##	The device identifier number for the SANsurfer application. This will help the user determine when the maximum number of devices for this loop has been reached.
Address	The Address is the 24-bit Physical Address of the device. Nodes connected to a Fibre Channel Fabric address each other, and the Switch, using the Physical Address of the fabric port to-which they are connected. The Physical Address is composed (left-to-right) of a four-bit Fabric ID, a six-bit Chassis Number, a six-bit port address within the chassis, and an eight-bit Arbitrated Loop Port Address (AL_PA). Arbitrated Loop ports use the AL_PA to describe the physical address of each port within the loop.
Device Name	This field identifies the World Wide Name of the fibre channel port of the device connected to the selected port. The Worldwide name is a 64-bit address composed of the 48-bit MAC address and a 16-bit NAA address.
Vendor	For public devices, this field contains the name of the manufacturer or the loop device. For private devices, this field is blank.
Type	For public devices, this field identifies the FC4 type of the device. For private devices, the type is “unknown”.
Status	This field indicates whether or not each device on the loop is Logged In, On Loop, or Bypass. Logged In indicates that the AL_PA address exists for the device and the device is logged into the fabric. This is the normal status for TL_Ports. On Loop indicates that the AL_PA address exists for the device but the device is not logged into the fabric. This is the normal status for SL_Ports. Bypass indicates that an active AL_PA address does not exist for a device where one previously existed.

Switch Faceplate Display (Port Display/T_Ports)

The Port Display window displays statistics for the selected T_Port. Figure 2-13 shows the window as it would appear as a T_Port.

The Previous and Next buttons will move through active ports on this switch until the first/last port is reached. When the first/last port has been reached, that button will no longer function and a warning message is displayed that the port limit has been reached.

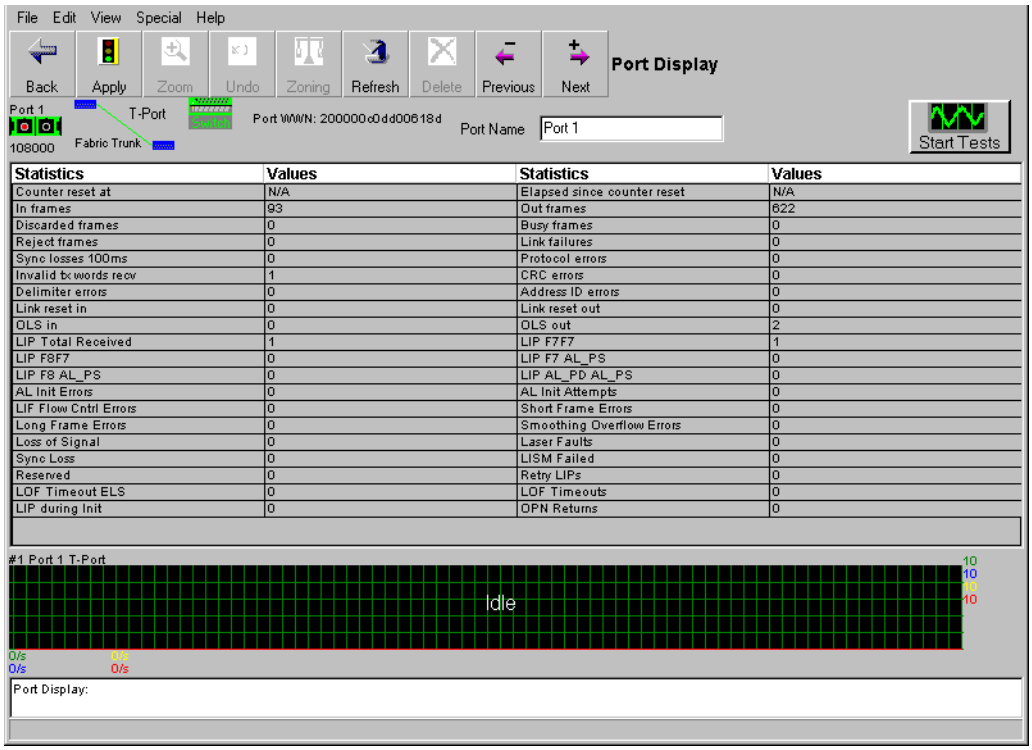


Figure 2-13 Port Display/T_Port

Entering the Port Display/T_Ports Window

In the Switch Faceplate Display window, click on the performance chart for the desired T_Port. You may also enter this window as the result of using the Previous or Next tool bar buttons while viewing other ports on this switch.

Switch Faceplate Display (Port Display/F_Ports)

The Port Display window displays statistics for the selected F_Port. Figure 2-14 shows the window as it would appear as a F_Port.

The Previous and Next buttons will move through active ports on this switch until the first/last port is reached. When the first/last port has been reached, that button will no longer function and a warning message is displayed that the port limit has been reached.

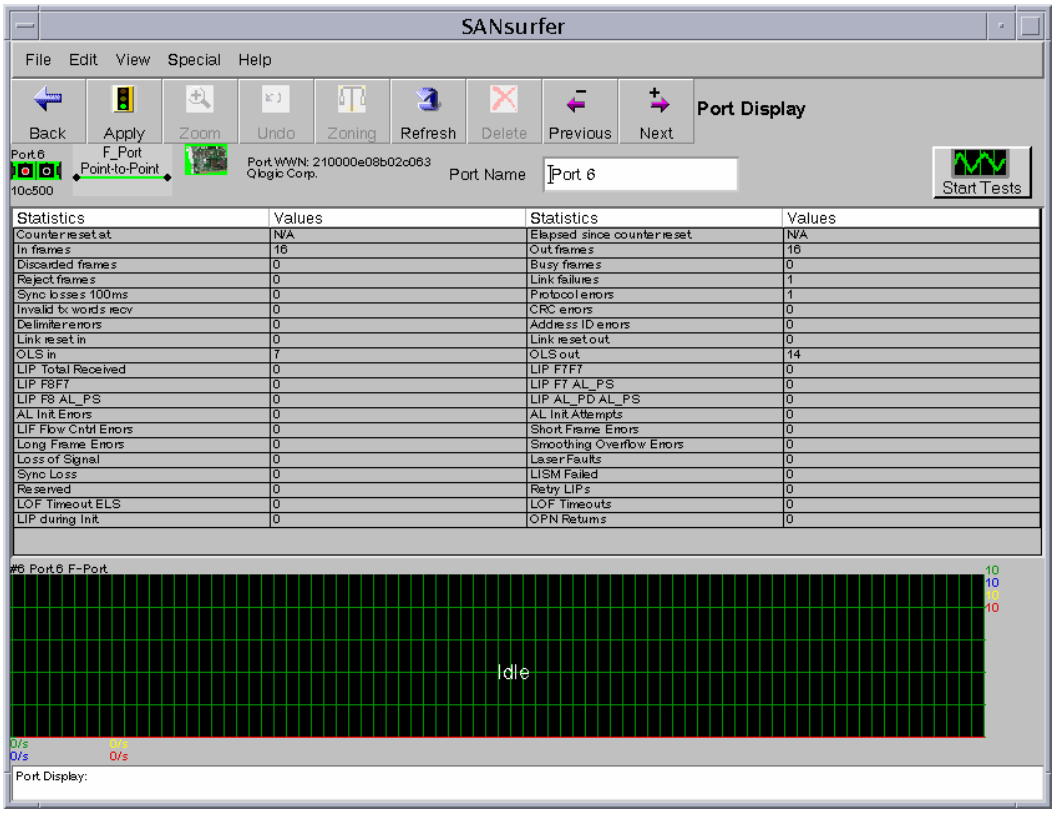


Figure 2-14 Port Display/F_Port

Entering the Port Display/F_Ports Window

In the Switch Faceplate Display window, click on the performance chart for the desired F_Port. You may also enter this window as the result of using the Previous or Next tool bar buttons while viewing other ports on this switch.

Switch Faceplate Display (View>Port Modes)

Refer to Figure 2-15.Port Modes allows configuring of any port to be an F_Port, fabric, SL_Port, TL_Port, or Offline.

F_Ports and fabric ports automatically become T_Ports when connection with another switch is detected.

Clicking on a port will cause it to change to the next sequential mode. When all modes have been stepped through, the sequence will repeat.

Right-clicking on a port produces a drop-down list of the available modes. Choose the desired mode and click to select.

Port modes can be altered on a per-port basis and saved to non-volatile memory within the switch. After changing any/all port modes, click the Apply button for the changes to take effect. Exiting the window or pressing the Refresh tool bar button without pressing the Apply button results in any changes being ignored.

Applying a port mode change while a data transfer is occurring will result in corruption of the data being transferred when the change is applied. For this reason, monitor the port performance prior to applying changes.

NOTE:
To update the display after port connections have been made at the switch, click the Refresh button on the tool bar.

Tuning a port that is part of a zone could cause it to be removed from that zone. Observe the zones assigned to this port before applying any mode changes to this port.

NOTE:
If ports appear with “unknown”, press the refresh button.

Entering the Port Modes Faceplate

Enter the Port Modes faceplate by choosing View>Port Modes while in the Switch Faceplate display.

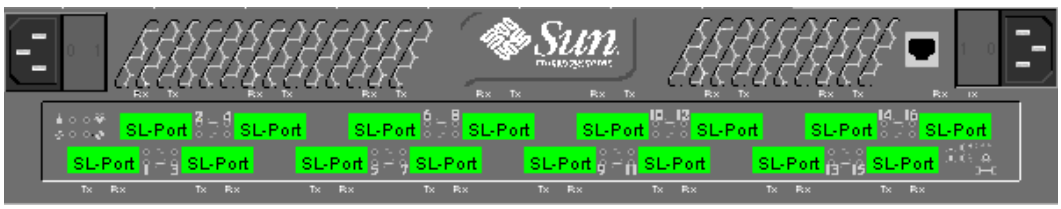


Figure 2-15 Switch Faceplate for Port Modes

Switch Faceplate Display (View>Port Tuning)

Refer to Figure 2-16. Port Tuning allows configuring any fabric port for one of several states. Each port can have a different tuning setting. After selecting the desired setting, click the Apply button to save the settings.

Click the desired port icon to sequentially advance through the port tuning choices or right click on a port to display available port mode selections. When sequencing through tuning choices, when all possible tuning states have been sequenced through, the process repeats. After right clicking on a port, choose the desired mode selection by clicking on it in the list.

Entering the Port Tuning Faceplate

Display the Port Tuning faceplate by choosing View>Port Tuning while in the Switch Faceplate display.

Port Tuning

In most circumstances, tuning of an individual port is not desirable and the default setting (Normal) should be left unchanged. However, certain Host-Bus-Adapters (HBAs) perform better with tuning. To support optimum performance with these HBAs, the Switch allows individual ports to be tuned based on the characteristics of a particular HBA. Tuning modes supported are:

Normal (default condition) No tuning applied. Recommended for Sun configurations.

Non-I - Non-Interleaved This option prevents sequences from different sources and bound for a single destination from being interleaved. Once a sequence has begun, the Switch will not transmit frames from any source other than the one which began the sequence. This mode is recommended only for Tachyon-based adapters being used for IP traffic. It is not recommended in any other circumstance.

Min-I - Minimize-Interleave This option, while not preventing interleaved sequences, minimizes their extent. Once a sequence has begun, the Switch will continue to transmit from the same source as long as frames are available for transmission or end-of-sequence occurs. If no frames are available for transmission, then a new source will be started and held until it has no frames to transmit or end-of-sequence occurs. This mode is recommended for QLogic 2xxx HBAs with non-Sun drivers. There is no need to make any changes for 2xxx HBAs running with Sun drivers.

Frame-L - Frame Limit This option limits the number of frames that can be transmitted during a single loop tenancy to 32. This option is recommended for JNI HBAs based on the ASICs, such as the JNI Emerald ASIC, and Adaptec HBAs.

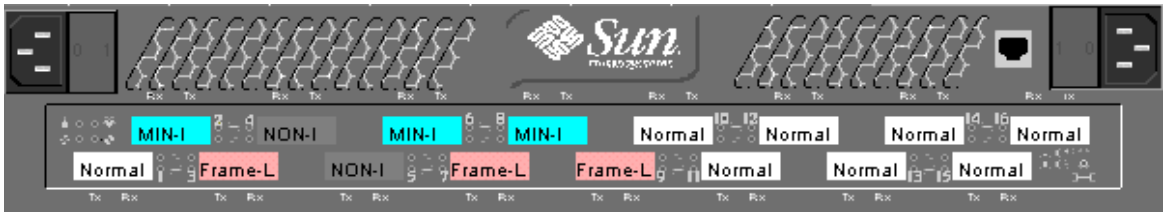


Figure 2-16 Switch Faceplate for Port Tuning

Switch Faceplate Display (View>Performance Data) (Default)

Refer to Figure 2-17. The Chassis Performance Data displayed in the Switch Faceplate display allows monitoring the performance of each “On Line” port on the Switch.

The Performance display shows a dynamic graph for each On Line port. When a port is Off Line or in Test, the graph for that port disappears. When a port is On Line, the display creates a graph for that port.

Each port graph is dynamic, updating every two seconds, and displays the number of Frames-In, Frames-Out, Dropped Frames, and Errors that occurred in the two-second interval. The application plots the data on the moving graph and displays the latest performance data numerically under each graph. Performance monitoring ceases when the window is exited to go to another window.

Entering the Performance Data Faceplate

The Performance Data is the default chassis data displayed when entering the Switch Faceplate display.

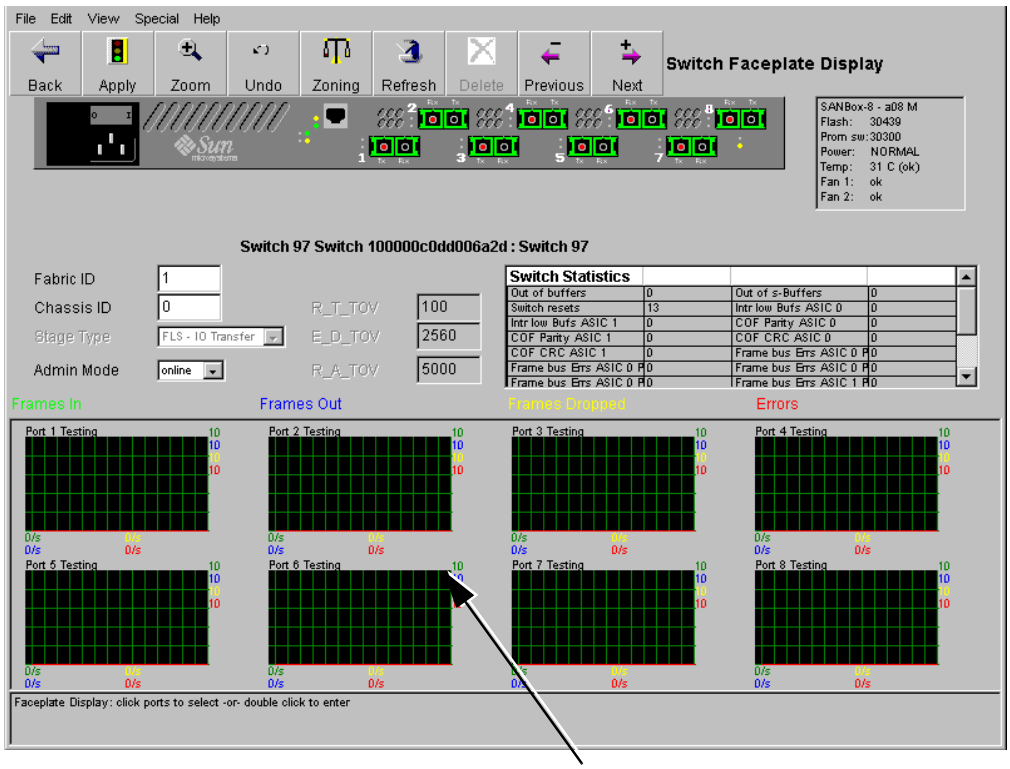


Figure 2-17 View>Performance

Switch Faceplate Display (View>Node Name)

Refer to Figure 2-18. The Node name data displayed in the Switch Faceplate display allows viewing the Name Server entry for every device connected to the selected chassis and registered with the Name Server. Private devices have no WWN, vendor, or FC-4 data in the table.

Entering the Node Name Data Window

Display the Name Service data by choosing View>Node Name while in the Switch Faceplate display.

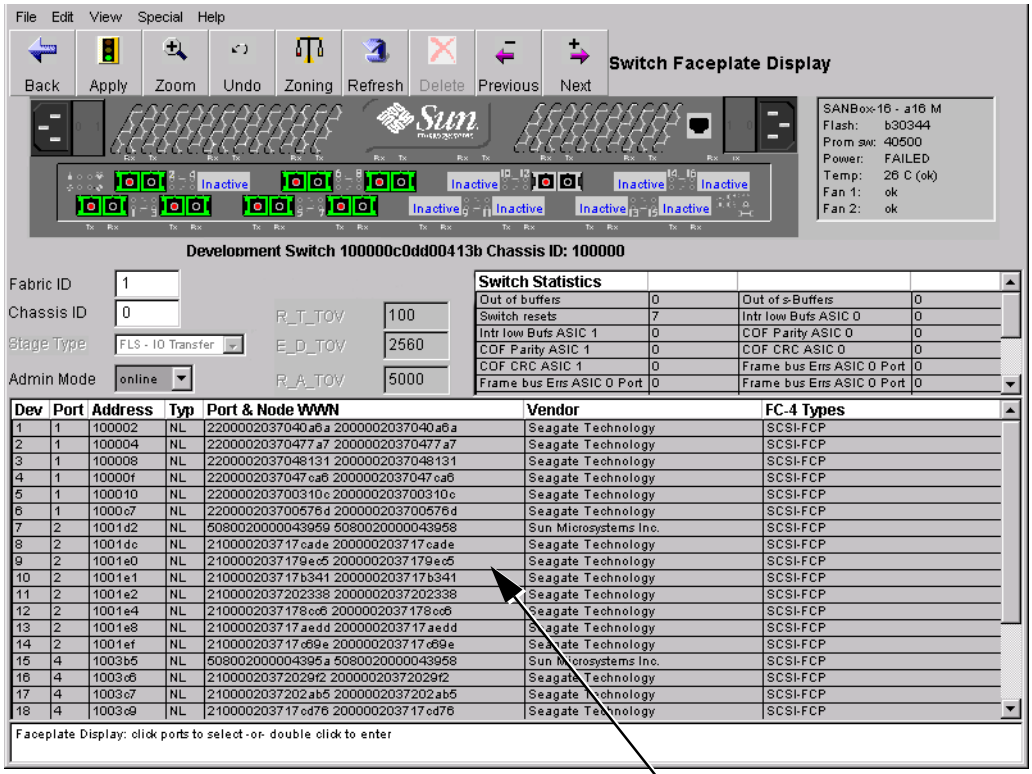


Figure 2-18 View>Node Name

Switch Faceplate Display (View>Trace Log)

Refer to Figure 2-19. Trace allows support personnel to follow the progress of selected operations as they proceed through the Switch. If, at some point, you are experiencing problems, a Support engineer may ask you to perform a Trace operation, read the results, and send them back to the factory. Therefore, **use this window only under the direction of your authorized maintenance provider**.

Entering the Trace Controls Faceplate

You display the Trace Controls by choosing View>Trace Log while in the Switch Faceplate display.

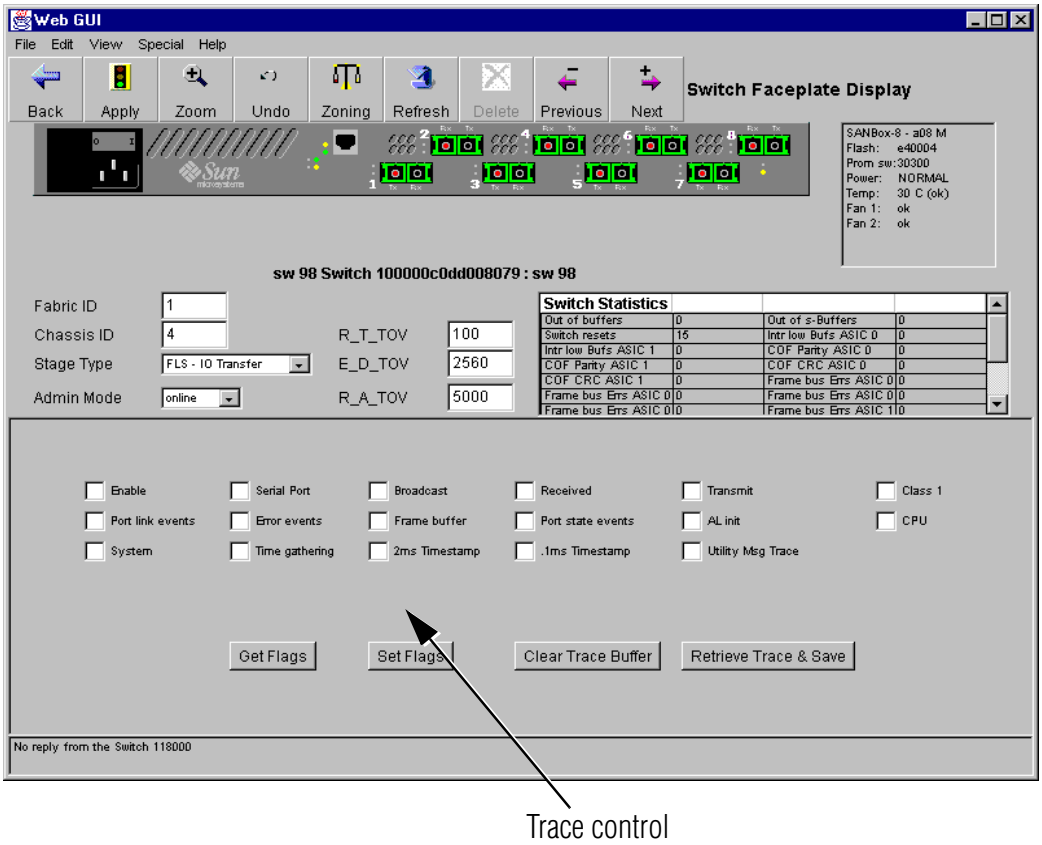


Figure 2-19 View>Trace Log

Trace Overview

A typical Trace scenario follows:

1. The Trace Controls Window shows a list of Trace Enable Flags with a checkbox for each. When you enter this window the boxes are all un-checked. Click the check-box(es) to select (check) one or more of the Trace functions.
2. Press the Clear Trace Buffer button to clear the Trace Buffer.
3. Press the Set Flags button to apply the selected Trace Enables to the Switch. This activates the selected Trace operations in the Switch. At this point the Switch is logging the progress of the enabled Trace functions into the Trace Buffer.

   Your authorized maintenance provider may have you perform a specific operation like attempt a login from a node connected to the Switch or communicate between devices interconnected through the Switch.
4. Press the Retrieve Trace & Save button to save the Trace Buffer to a file.
5. To disable all Trace functions in the Switch, press the Set Flags button with all Trace functions disabled (not checked). This disables all Trace functions in the Switch. After disabling all the Trace functions in the Switch, you may press the Get Flags button just to make sure the list comes back from the Switch with all the Trace functions clear (not checked).
6. Your authorized maintenance provider will explain how and where to send the file of the Diagnostics Trace Buffer.

Switch Faceplate Display (View>Memory Map)

Refer to Figure 2-20. View Memory allows support personnel to read and write selected memory locations in the Switch. If there are problems, a support engineer may ask you to perform these operations, display the results, and send them back to the support facility. Therefore, **use this window only under the direction of your authorized maintenance provider**.

Entering the Memory Map Window

Display the Memory Map window by choosing View>Memory Map while in the Switch Faceplate displays.

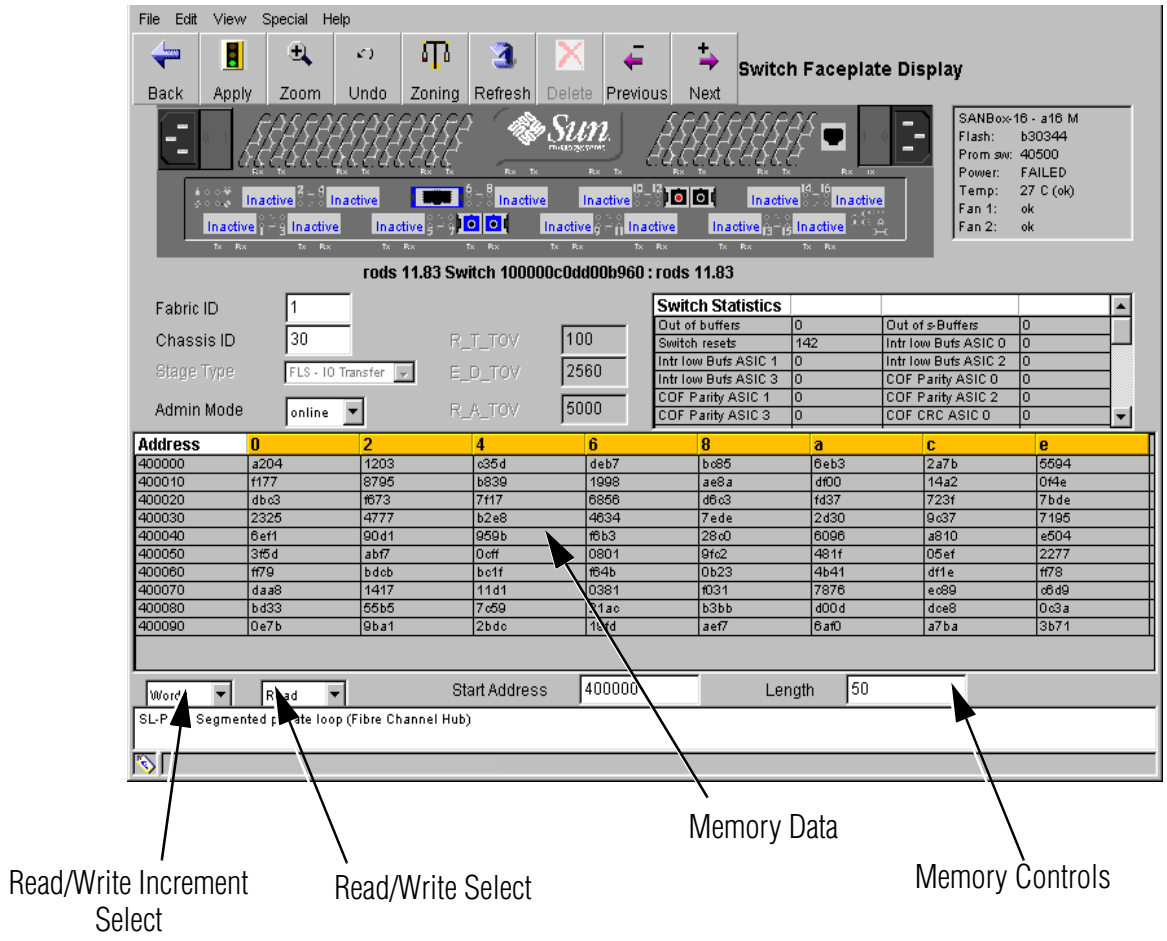


Figure 2-20 View>Memory Map

Tool Bar

Apply Button

Press the Apply button in the Tool Bar to execute the selected memory operation. If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Back Button

Press the Back button to leave this window without saving any changes that have been made since the last time the Apply button was pressed.

Memory Controls

Refer to Figure 2-20. The Memory controls affect the quantity and format of the memory contents on the display. When attempting to modify memory contents, the following order of events must be followed:

1. Select the read mode.
2. Enter the desired range and increment length for the affected memory block.
3. Press the Apply button.
4. Select the write mode.
5. Modify the desired memory locations.
6. Press the Apply button.

Read /Write Increment Select

Select the read or write increment. Choices are Bytes, Words (16 bits), or Dwords (32-bit Double Words). The increment selected will affect how the memory data is displayed in the memory map.

Read /Write Select

Select the type of operation, Read or Write.

Start Address Field

Place the cursor in the field and type the Start Address.

Length Field

Place the cursor in the field and type the length in terms of Bytes, Words, or Dwords. This value is a Hex value.

Memory Data Fields

If the selected operation is a memory read, the application will display the selected data in the Memory Data portion of the window. The data is for display only. There is no way of saving the data to a file.

If the selected operation is a memory write, make all memory control selections, place the cursor in the appropriate memory data field, and type the new data. Press Apply in the Tool Bar to execute the operation.

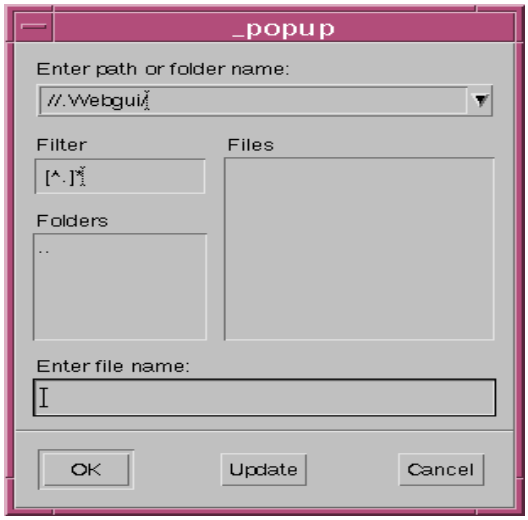
NOTE:
A write will alter the contents of the changed memory address(es) and may alter the way the switch operates. Once a memory address has been changed, the only way to get the original value back is to write the memory with the address content containing the original value.

Switch Faceplate Display (Special>Update Flash)

Refer to Figure 2-21. Update Flash enables loading new control code into the Flash memory of the selected chassis and also to command the selected chassis to perform a Reset operation. The Reset operation may be separate, or in conjunction with a Flash load. For multiple switch fabrics, you must update firmware on each switch individually.

You may load new Chassis Control firmware while the Switch is operating under the old Flash code. The Switch will not use the new Flash code until it is Reset. A Reset operation performed on the Switch chassis will disrupt the Switch operation.

In the event that your Flash memory requires an update, your authorized maintenance provider will supply a binary Flash update file. Load this file on to the management station before starting the Flash update.



NOTE: Flash files use a naming scheme to represent the switch type for which they apply. Files starting with “M08” pertain to 8-port switches. “M16” files pertain to 16-port switches.

Figure 2-21 Special>Update Flash

Choosing Update Flash

Update the Flash memory in the selected chassis by choosing Special>Update Flash while in the Switch Faceplate displays.

Load Flash

1. Load the file containing the new Flash code on the management station.
2. Choose Special>Update Flash. The application displays a standard “Open” dialog box that allows you to browse-to, and open, the Flash update binary file. When you open the Flash update file, the application checks the file for a valid checksum, then (if correct) starts the Flash load. If the checksum is not

correct the application will warn you. The application displays information about the progress of the Flash update. This information includes:

- **File** The name of the Flash update binary file.
- **Position** Number of bytes downloaded.
- **Total** The total number of bytes in the file.
- **Complete** The percentage of the file sent to the chassis.

3. When the Flash load is complete, the application displays a dialog box that states that the Flash load is complete and asks whether to Reset Immediately.

   Click Yes to Reset now. Remember, A Reset operation will disrupt the operation of the Switch.

   To delay the Reset operation until traffic is removed from the Switch, click No. Perform the Reset later by choosing Special>Reset in any of the Chassis Faceplate windows. Refer to the Special>Reset paragraphs later in this manual.

   If the Flash load fails, refer to the Flash Load Fails paragraphs.

Flash Load Fails

In the event that the Flash load fails, a dialog box asks whether to try again. The Switch will still remain operable until a Reset occurs (Assuming, of course, that the Switch was operating before an attempt to load new Flash code). Trying multiple times to load new Flash code will not upset operation of the Switch as long as the Switch isn't Reset.

If a Switch Reset occurs, the Switch will try to use the new Flash code and will discover that it is bad. The Switch will display a Heartbeat error code of three blinks indicating a Flash Checksum error. The Switch is still able to load new Flash code but is not operable until the new code is successfully loaded and the Switch is again Reset.

When the Flash load is successful, Reset the Switch to put the new Flash code into operation.

Switch Faceplate Display (Special>Reset)

Special>Reset allows resetting the selected Switch chassis.

Choosing Reset

Reset the selected Switch chassis by choosing Special>Reset while in the Switch Faceplate displays. The application resets the selected Switch chassis immediately.

Zoning

Zoning allows the user to divide the fabric ports into zones for more efficient and secure communication among functionally grouped nodes. There are several types of zones and a port may be defined in any or all of them. No port can be in all zone types simultaneously.

- **Hard Zones**

  Hard Zones allow the division of the fabric (one or more Switch chassis) into as many as 16 fabric-wide zones that define the ports that may communicate with each other. A particular port may be placed in only one Hard Zone (no overlapping Hard Zones). If Hard Zones are enabled, Broadcast Zones, Name Server Zones, and SL Zones will not communicate across defined Hard Zone boundaries.

- **Broadcast Zones**

  Broadcast Zones allow the division of the fabric (one or more Switch chassis) into as many as 16 fabric-wide zones that define the area of Broadcasts. A particular port may be placed in one or more of these Broadcast Zones. A port will broadcast to all ports in the same Broadcast Zone (or zones) in-which the port is defined. If Hard Zones are enabled, Broadcast Zones will not communicate across defined Hard Zone boundaries.

  In the event that a hard zone is defined that causes ports within the same broadcast zone to appear in different hard zones, the broadcast zone will be split. When the broadcast zone is split, the zones will have the same identifying values for the broadcast zone name or number.

  An ISL belongs to the Hard Zone that it resides in and is shared between all Broadcast Zone, SL zone, Name Server zones in that Hard Zone.

- **Name Server Zones**

  Name Server Zones allow the division of the **fabric** (one or more Switch chassis) into as many as 256 fabric-wide zones that define which ports or devices receive Name Server information. If Hard Zones are enabled, Name Server Zones will not communicate across defined Hard Zone boundaries.

  In the event that a hard zone is defined that causes ports within the same name server zone to appear in different hard zones, the name server zone will be split. When the name server zone is split, the zones will have the same identifying values for the name server zone name or number.

  If a zone is defined by port number, a port will receive Name Server information for all ports in the same Name Server Zone (or zones) in-which the port is defined.

An ISL belongs to the Hard Zone that it resides in and is shared between all Broadcast Zone, SL zone, Name Server zones in that Hard Zone.

- **SL_Port Zones**

  SL Zones on the switch allow the division of the fabric (one or more Switch chassis) into fabric-wide zones that define the ports that may communicate with each other. A particular port may be placed in only one Hard Zone (no overlapping Hard Zones). If Hard Zones are enabled, SL zones will not communicate across defined Hard Zone boundaries.

  In the event that a hard zone is defined that causes ports within the same SL zone to appear in different hard zones, the SL zone will be split. When the SL zone is split, the zones will have the same identifying values for the SL zone name or number.

  An SL zone may only contain 32 or fewer ports with 126 or fewer total devices.

  An ISL belongs to the Hard Zone that it resides in and is shared between all Broadcast Zone, SL zone, Name Server zones in that Hard Zone.

Hard Zone Rules

1. A Hard Zone is only valid if it is enabled.
2. If Hard Zones are enabled, Broadcast Zones, Name Server Zones, and SL Zones will not communicate across Hard zone boundaries. Adding a Hard zone after other zone types are defined may result in splitting those other zone types so as to make those zones into two unconnected pieces which will be unable to communicate with each other.

   For example: If Hard Zoning in a particular Switch chassis places Port 6 in one zone and Port 7 in another zone, Broadcast, Name Server, or SL Zoning must not include Ports 6 and 7 in the same zone.
3. Hard Zones operate fabric-wide.
4. There is a maximum of 16 Hard Zones (independent of other zone types). The SANsurfer management application numbers them 1 through 16.
5. A port may be defined as being in only one Hard Zone (Hard Zones may not overlap each other).
6. **If Hard Zones are enabled, all ports in the fabric must be defined in a Hard Zone (that is, there may be no Hard Zone Orphans).**
7. If a particular Hard Zone exists in more than one Switch Chassis in a Multi-Stage Switch, these scattered pieces of Hard Zone must be interconnected by T_Ports as though they were separate chassis. They must use the same

topology as the rest of the fabric. That is, if the rest of the chassis are connected in a Cascade topology, the Hard Zones must be connected in Cascade.

8. All SL_Ports for a particular segmented loop must be in the same Hard Zone.
9. All ISLs belong to the hard zone that they reside in. If there is a cable between two switches but the two ports of that cable do not belong to the same Hard Zone, then there will be no link between those two ports.
10. An ISL belongs to the Hard Zone that it resides in and is shared between all Broadcast Zone, SL zone, Name Server zones in that Hard Zone.

Broadcast Zone Rules

1. A Broadcast Zone is only valid if it is enabled.
2. If Broadcast Zones are used on a Single Stage Switch in-which Hard Zones are defined, the Broadcast Zones must not overlap Hard Zone boundaries.

   For example: If Hard Zoning in an 16-port Single Stage Switch places Port 4 in one zone and Port 5 in another zone, Broadcast Zoning must not include Ports 4 and 5 in the same zone.
3. Broadcast Zones operate fabric-wide.
4. There is a maximum of 16 Broadcast Zones.
5. A port may be defined as being in one or more Broadcast Zones (Broadcast Zones may overlap).
6. When a port sends a broadcast, the broadcast goes to all ports in the Broadcast Zone (or zones) that the port is defined in.
7. All ports not defined as being part of any enabled Broadcast Zone are Broadcast Zone Orphans. Broadcast Zone Orphans are all listed in the Broadcast Orphan zone. When a port listed in the Orphan zone is assigned to a Broadcast zone, it no longer appears in the Orphan zone.
8. All SL_Ports for a particular segmented loop must be in the same Broadcast Zone.

Name Server Zone Rules

1. A Name Server Zone is only valid if it is enabled.
2. If Name Server Zones are used on a Switch in-which Hard Zones are defined, the Name Server Zones must not overlap Hard Zone boundaries.

   For example: If Hard Zoning in a Switch places Port 4 in one zone and Port 5 in another zone, Name Server Zoning must not include Ports 4 and 5 in the same zone.

3. Name Server Zones operate fabric-wide.
4. There is a maximum of 256 Name Server Zones in a fabric; there is a maximum of 16 name server zones within each hard zone.
5. A port or device may be defined as being in one or more Name Server Zones (Name Server Zones may overlap).
6. When a port receives Name Server information, it will receive information about all ports in the Name Server Zone (or zones) in which the port is assigned.
7. All ports (or devices) not defined as being part of any enabled Name Server Zone are Name Server Zone Orphans. Name Server Zone Orphans are all listed in the Name Server Orphan zone. When a port listed in the Orphan zone is assigned to a Name Server zone, it no longer appears in the Orphan zone.

SL Zone Rules

1. An SL Zone is only valid if it is enabled.
2. If SL Zones are enabled, Hard Zones may not overlap SL zone boundaries.

   For example: If SL Zoning in a particular Switch chassis places Port 6 in one zone and Port 7 in another zone, a Hard Zone should not include Ports 6 and 7 in the same zone or it will split the SL ports from their respective SL Zones.
3. SL Zones operate fabric-wide.
4. A port may be defined as being in only one SL Zone (SL Zones may not overlap each other).

Zoning Window

Refer to Figure 2-22. The Zoning window allows configuring ports in the selected fabric into zones for more efficient and secure communication among functionally grouped nodes.

Entering the Zoning Window

Press the Zoning button in the Tool Bar on topology or switch faceplate display windows.

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and Help. These menus are context-dependent. That is, they each may contain different sub-menus depending on the window they are in.

File

Except that the Open Fabrics entry is not available from this window, the File Menu contains the same sub menus as the Fabric window (descriptions of these sub menus can be found on page 2-15).

Edit

The Edit Menu contains the following sub menus:

- User Administration — Go to the User Administration window (refer to page 2-73).

View

The View Menu contains the following sub menus:

- Zoom In — Inactive.
- Zoom Out — Same as Back button.
- Return to Fabric Screen — Return to the Fabric window
- Fabric Zoning — Inactive.
- Load Balance — Inactive.

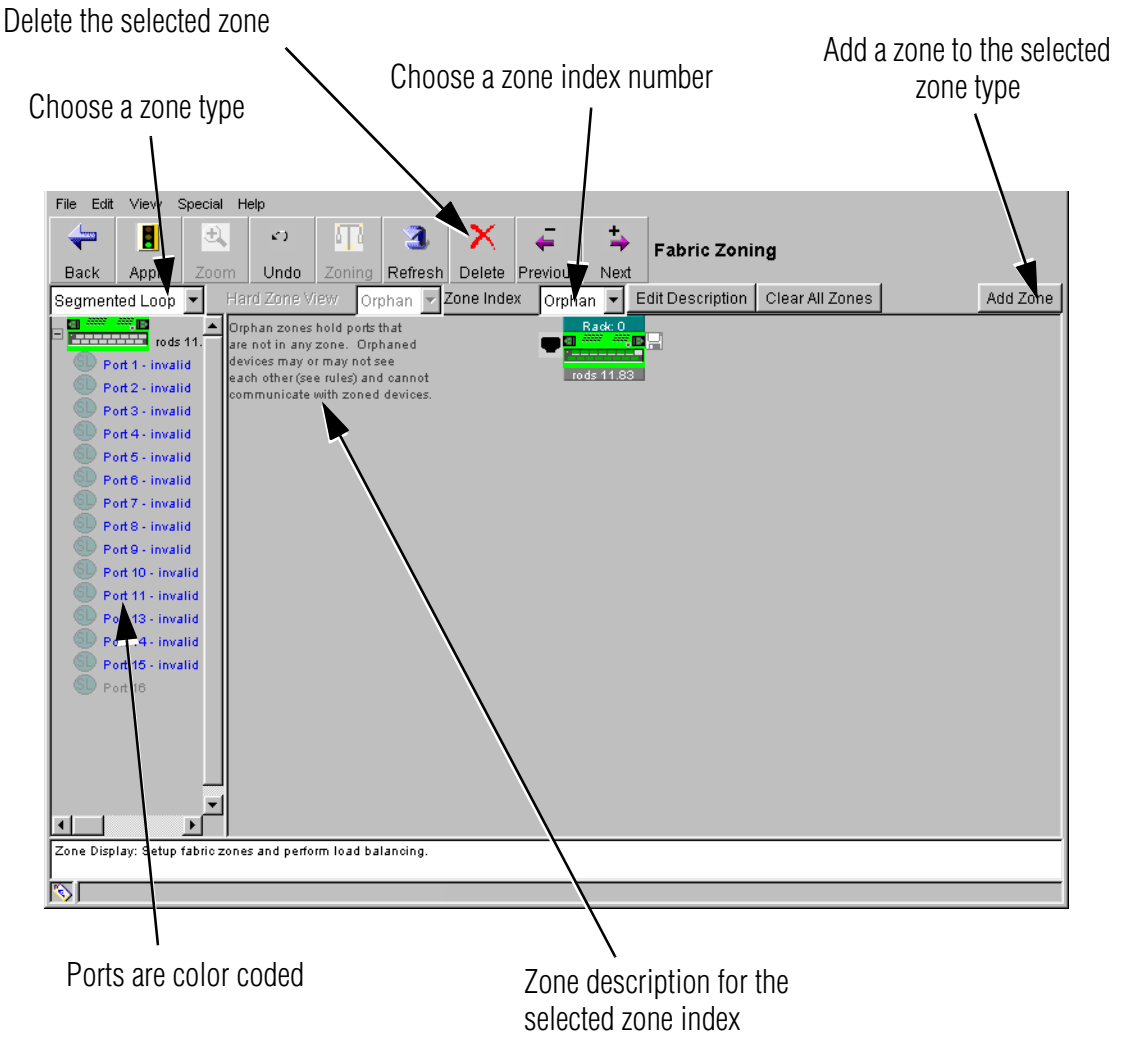


Figure 2-22 Zoning Window

Special

NOTE:
Template file extensions will differ depending on the stage type of the switches in the fabric. If the switches are SL Private Loop stage types, the extension is .tpl. If switches are IO/T stage types, the extension is .tp2.

The Special Menu contains the following sub menus:

- Save Template to File — save the currently-defined fabric zones to a file

NOTE:

- When performing a Load Template from File, ensure that none of the ports currently displayed are selected for addition to or removal from the zone. If a template is loaded with ports selected, the ports may become invalid.
- Zone definitions will not be loaded on switches that were not part of the fabric when the template file was saved.

- Load Template from File — load a saved fabric zone definition
- Delete Template File — delete a saved zone definition file
- Backup WWN Zoning — not currently used

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Tool Bar

Back button

Press Back to go to the Topology window or the switch faceplate display.

Apply Button

Press Apply to cause the Switch to use the new information. If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Refresh Button

Press the Refresh button to poll the Switch. The application updates the current conditions.

Delete Button

Press Delete to remove the selected zone. Press the Apply Button to save the change.

Previous Button

Press to move to the previous zone number in the available zone numbers for the selected zone type. If nothing is before the current selection, the button has no effect.

Next Button

Press to move to the next zone number in the available zone numbers for the selected zone type. If nothing is after the current selection, the button has no effect.

Hard Zone View Field

When viewing a zone type other than hard zone, this field will cause the left column to display only ports which are resident in the selected hard zone. This will prevent trying to select ports which are in other hard zones. If hard zones are not defined, the orphan should contain all ports in the fabric.

Zone Index Field

This field contains the defined zones of the type selected.

Edit Description Button

Press the edit description button to modify the on-screen description of the selected zone. After modifying the description, press the Done button in the lower right corner of the description dialog box.

Clear All Zones Button

Press the clear all zones button to remove all defined zones.

Add Zone Button

Press the add zone button to add a zone in the selected zone type. If the maximum number of zones for that type has been defined, the button has no effect.

Criteria for Displaying a Port

The application polls each switch to determine the ports that have a device attached to them. If a port is configured and has a GBIC installed, it will be shown as inactive unless the device responds to contact made with it.

NOTE:
Port modes are determined at the time the zoning window is entered. Port connection changes made while in the zoning window will require returning to the faceplate window or the topology window and pressing the Refresh button on the tool bar. Re-entering the zoning window will display the current port modes.

Adding a Zone

For information about Port Groups Zoning Method, refer to page 2-21.

Refer to Figure 2-22 on page 2-66.

1. Choose a Zone Type. Zone Types are:
   - Hard Zones
   - Broadcast Zones

- Name Server Zones
- Segmented Loop

2. (Note: If configuring a Hard Zone, proceed to step 4.) Choose a Hard Zone View. The Hard Zone View will determine which ports (or devices) are visible in the left column of the zoning window. If hard zones are defined, select the hard zone that the desired ports (devices) reside in. If no hard zones are defined, select the Orphan value.
3. Choose a Zone Index number. The application starts with one zone. The zone does not include any ports or devices in the zone. A zone of the selected Zone Type is added by pressing the Add Zone button. To view existing Zones of the type selected, press the Next or Previous buttons in the Tool Bar.
4. In the left column, select/deselect ports for the zone:
   a. To select the desired port(s) to add, click either on, or to the left of, the port type icon. To select more than one port, hold the Ctrl key and left click the additional ports. When a port is selected, the port number will change to yellow and the word “add to zone” is placed behind the port number.
   b. To deselect any/all of the ports, click to the right of the port number to be deselected. Hold the Ctrl key to only deselect the current choice. If the Ctrl key is not held, clicking to the right of any port will deselect all selected ports.

NOTE:
If assigning ports to hard zones, if any port is not selected for a hard zone when the Apply button is pressed, the following warning message will be displayed:

```
All ports must be in one and only one Hard Zone.
```

The zone assignment will not be saved until all ports are assigned to a hard zone. The ports that are not assigned to specific hard zones will need to be grouped as one additional hard zone. They will not be allowed to remain in the orphan zone.

---

5. After all desired ports have been selected, press the Apply button. Observe a message about the settings being saved to disk. Click on OK.
6. After saving the zoning change, the selected port names change from yellow to green and the word “add to zone” is removed. An additional message asking whether to save the zone is displayed. Click on Yes to save this zone, or No to erase the zone upon exiting the SANsurfer application.

7. If desired, the zone description displayed along the left side of the window can be modified to contain information that will assist others in determining how this zone has been defined.
    a. Click on the Edit Description button. The currently-defined description will appear in the left column of the zoning window.
    b. Modify the description. Press the Return key to force a new line.
    c. When finished, click on the Done button at the bottom of the column.
    d. Press the Apply button to save the changes.

Removing a Zone

NOTE:
To remove all zones of a single zone type, choose the desired zone type and press the Clear All Zones button. This has no effect on other zone types.

When a zone is deleted, subsequent zones listed in the Zone Index list are renumbered so that zone numbers remain in sequential order. Member ports of a deleted hard zone become members of the orphan zone.

1. Choose a zone type.
2. Choose the desired Zone Index number.
3. Press the Delete button. Acknowledge that the zone is to be deleted.

Removing a Port from a Zone

1. Choose a zone type.
2. Choose a Zone Index number.
3. Choose the port(s) to delete from the left column:
    a. To select the desired port(s) to remove, click either on, or to the left of, the port type with the circle around it. To select more than one port, hold the Ctrl key and click each additional port. When a port is selected, the port number will change to violet and the word “remove from zone” is placed behind the port number.
    b. To deselect any/all of the ports, click to the right of the port number to be deselected. Hold the Ctrl key to only deselect the current choice. If the Ctrl key is not held, clicking to the right of any port will deselect all selected ports.

NOTE:
If removing a port from a hard zone, that port must be assigned to another hard zone. If any port is not assigned to a hard zone, the following warning message will be displayed:

```
All ports must be in one and only one Hard Zone.
```

If this port does not belong in any of the defined hard zones, an additional hard zone must be created in which to place the port.

1. After all desired ports have been selected, press the Apply button. Observe a message about the possibility that modifying switch zoning may disrupt traffic on an active zone. Click on Yes to continue, or No to cancel the operation.
2. After saving the zoning change, the selected port names change from violet to black and the word “remove from zone” is removed. An additional message asking whether to save the zone is displayed. Click on Yes to save this defined zone, or No to erase the zone when the SANsurfer application is exited.

Combining Fabrics with Zones Defined

There may be an occasion when two fabrics are to be connected and both fabrics have zones defined. When the fabrics are connected, zones with the same name will become a single zone with that name. If the devices within the zones with the same name should not be zoned together:

- Define the zone in one fabric as a new zone that doesn't exist in the other fabric
- Remove the ports zoned to the previous zone but don't remove the zone itself. When a zone is deleted, the subsequent zones will be renumbered so they remain in sequential order.

For example, if fabric A is using zones 1 and 2, and fabric B is using zones 1, 2, and 3, connecting the two fabrics will result in zones 1, 2, and 3. Assuming that combining zone 1 from each fabric is acceptable but combining zone 2 is not, the following steps would be necessary:

1. Go to the Fabric Zoning window for the fabric with the most defined zones (in this example it is fabric B). Select the zone type to be changed.
2. Select the Zone Index for zone 2 (the zone that can't be combined with zone 2 of fabric A).
3. Record the ports attached to this zone.
4. Remove all assigned ports.
5. Click on the Add Zone button. Observe that zone 4 is created.
6. Add the ports that were designated as part of zone 2.
7. Click the Apply button to save the changes.

The new fabric will contain four zones for this zone type. When the two fabrics are connected, the result will have zone 1 from both fabrics combined in zone 1, zone 2 will have the ports defined for the original fabric A, zone 3 will contain the original ports defined for zone 3 of fabric B, and zone 4 will contain the ports defined in the original zone 2 of fabric B.

User Administration Window

Refer to Figure 2-23. The User Administration window allows a Super User to manage access to fabric management and also to set the screen resolution that the application will use to communicate with the management station monitor screen. Only a super user can open this window, and save changes to it.

Entering the Administration Window

Enter the User Administration window by clicking on the current login information area on the Fabric window or by selecting Edit>User Administration from the menu bar of any window.

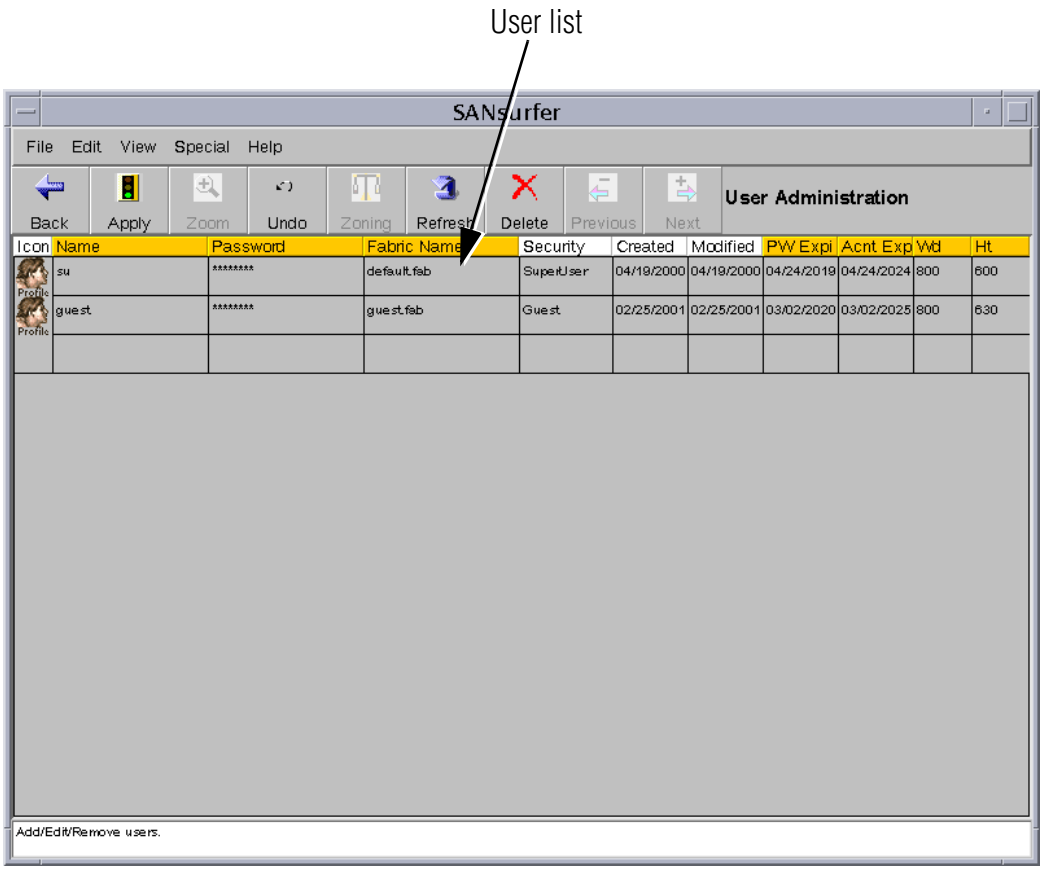


Figure 2-23 Edit User Accounts

Main Menu Bar

There are five menus on the Main Menu Bar: File, Edit, View, Special, and Help. These menus are context-dependent. That is, they each may contain different submenus depending on the window they are in.

File

Except that the Open Fabric command is not available, the File Menu contains the same sub menus as the Fabric window (descriptions of these sub menus can be found on page 2-15).

Edit

The Edit Menu contains the following sub menu:

- User Administration — Go to this window.

View

The View Menu contains the following sub menus:

- Zoom In — Not available.
- Zoom Out — Same as Back button.
- Return to Fabric Screen — Return to the Fabric window

Special

No sub-menus.

Help

The Help menu contains the following entries:

- About SANsurfer — Display a screen containing the product name and version level.
- SANsurfer Online Help — Display the online help dialogue box. Use this dialogue box to search for a topic or term.

Tool Bar

Back Button

Press Back to go to the previous window.

Apply Button

Press Apply to cause the Switch to use the new information. A dialog box will ask whether to save the new information in the Switch Flash memory.

If the Apply operation cannot be completed because of an error or a conflict, the attempted changes will remain in the display. Choose the Refresh button to restore the display to show the actual status.

Undo Button

Press Undo to ignore all changes made to this window since the last Apply operation.

Refresh Button

Press the Refresh button to poll the Switch. The application places the current switch settings in all displayed fields.

Delete Button

Press Delete to remove the selected user. Press the Apply Button to save the change.

User List

Each line (entry) in the User List defines a user. Initially, the User List defines the default user, a Super User. The Super User has total authority. Refer to the Security Level description later in this text. The User List also always contains a blank line for creating a new user.

You may modify any entry by selecting the information in a field in the entry and typing new information. Press Apply when your changes are complete. You may create a new user with the blank line.

The first Super User is encouraged to modify these defaults to reflect real users. After all changes are made to this window, press the Apply button to implement the changes.

The following describes each field in a Users List entry.

Name

This field is case sensitive. The Name field contains the User Name with a maximum length of 30 characters. The default is *su*. Modify this field by selecting the field content and typing new information. Press the tab key to move to the password field.

Password

This field is case sensitive. The Password field contains the user password. The default is *su*. Modify this field by selecting the field content and typing new information. The maximum password length is 30 characters. The password is visible as long as you remain in this field. After typing the password, ensure that what you want has been typed correctly. The password will change to asterisks as soon as you move to any other field in the window. If a non-super user password is forgotten, the super user may enter this window, highlight the affected password and enter a new password. If the super user password is forgotten, it will not be possible run the SANsurfer application from this switch and will require the application to be removed and reinstalled. However, if another switch has been accessed and the SANsurfer application is currently running, it is possible to access this switch.

To ensure that security is in place, it is recommended that any switch with Ethernet access be given user names and passwords.

Fabric Name

The Fabric Name field contains the name of the file, or files, that the application uses to store user list data. You may have more than one file. The default file name

is *default.fab*. You may use any name you want. Modify this field by selecting the field content and typing new information.

Security Level

The Security Level field contains the user authority. The defaults are *Guest* and *SuperUser.*

There are three levels of authority;

Guest A Guest user may view any fabric but may not apply (save) any changes.

Administrator An Administrative user may do anything but view or modify user list information.

SuperUser A Super User may do anything.

Modify this field by selecting the field content and typing new information.

Created

The Created field is read-only and displays the date that the entry was created.

Modified

The Modified field is read-only and displays the date that the entry was modified.

PW Expire (only applies to guest and administrator)

The Password Expire field contains the date that the user password expires. Modify this field by selecting the field content and typing new information. The dates must be in the form month#/day#/four-character year.

Acnt Expire (only applies to guest and administrator)

The Account Expire field contains the date that the user account expires. The user will not be able to log in after that date. Modify this field by selecting the field content and typing new information. The dates must be in the form month#/day#/four-character year.

NOTE:
When selecting the width and height settings for the management station, remember that higher pixel counts will result in smaller letters and icons, but column headings, counter names, and other fields will not be truncated as severely as with lower pixel counts.

Wd

The Screen Width field contains the width in pixels of the management station monitor. Modify this field by selecting the field content and typing new information.

The value assigned to each user can vary, depending on the information being viewed. The assigned value becomes active at user login.

Ht

The Screen Height field contains the height in pixels of the management station monitor. Modify this field by selecting the field content and typing new information.

The value assigned to each user can vary, depending on the information being viewed. The assigned value becomes active at user login.

Notes

Section 3 SNMP

Simple Network Management Protocol (SNMP)

SNMP allows you to read management information from the Switch using SNMP as the transport protocol. The MIB II Systems Group objects, *sysName*, *sysContact*, and *sysLocation* can also be modified using SNMP.

Managing the Switch Using the SNMP

NOTE:
Before you use SNMP, you must connect the Switch's Ethernet interface to an Ethernet network and configure its IP network address, its IP subnetwork mask, and its IP gateway address. Refer to "Ethernet Cabling" on page 1-1 and "Configuring the Switch Ethernet Port" on page 1-5.

Management Information Base (MIB)

Switch MIB objects consist of 8 functional groups. These groups are:

- *system* MIB II SystemsGroup
- *interface* MIB II Interfaces Group
- *snmp* MIB II SNMP Group
- *fcFeConfig* Configuration
- *fcFeOp* Operation
- *fcFeError* Error
- *fcFeCap* Capabilities
- *anMkiiAccounting* Accounting

Each group has one or more tables associated with it.

The Switch does not support the Accounting Group of the draft standard Fibre Channel MIB. Instead, it supports the QLogic enterprise accounting MIB *anMKII-Accounting*.

The Fibre Channel Fabric Element MIB defines the *fcFeConfig*, *fcFeOp*, *fcFeError*, and *fcFeCap* groups. The QLogic MKII Accounting MIB defines the ***anMkiiAccounting*** group. All MIBs are available on the Internet through the QLogic Customer Services link in the QLogic Web-site (www.QLogic.com).

MIB II (RFC 1213) Groups

- *system*

  high-level host information

- *interface*

  configuration information, and traffic and error statistics for the Ethernet interface

- *SNMP*

  configuration information, and traffic and error statistics for the SNMP agent

Configuration Group Tables

- *fcFabricName*

  Fabric Name: a universally unique name for the Fibre Channel Fabric, including all nodes and switch elements

- *fcElementName*

  Element Name: a fabric-unique name for this switch element

- *fcFeModuleCapacity*

  Module Capacity: the number of modules in this switch element

- *fcFeModuleTable*

  Module Table: a table of information about each module in the switch element

- *fcFPortConfigTable*

  Port Configuration Table: a table of the current configuration parameters for each port in the switch element

Operation Group Tables

- *fcFPortOperTable*

  F_Port Operations Table: a table of the operational values of each port in the switch element

- *fcFPortFlogiTable*

  F_Port Login Table: a table of the service parameters defined during the last login

- *fcFPortPhysTable*

  F_Port Physical Level Table: a table giving the physical status of each port in the switch element

Error Group Tables

- *fcFPortErrorTable*

  F_Port Error Table: a table of error counts for each port in the switch element

Account Group Table

- *anMkiiAccounting*

  a table of traffic statistics for each Fibre Channel port

Capability Group Tables

- *Port CapabilitiesTable*

  a table of configuration parameters supported by each pot in the switch element

Notes

Appendix A Counter Descriptions

Each switch contains numerous counters that keep track of various properties. The counters may appear in different locations with different names or with a name that may not be self-explanatory as to its function. This appendix defines the counter names and their functions. Table A-1 describes the counters that appear in the statistics on the port display window. Table A-2 describes the counters that appear in the statistics on the faceplate window.

Table A-1 Counter Names and Descriptions (port display window)

Counter Name (in port display)	Description
Address ID errors	Number of address identifiers (S_ID, D_ID) found to be in error.
AL Init Attempts	Number of times the port entered the initialization state.
AL Init Errors	Number of times the port entered initialization and the initialization failed.
Busy frames	Number of class 2 and class 3 fabric busy (F_BSY) frames generated by this port in response to incoming frames. This usually indicates a busy condition on the fabric or N_port that is preventing delivery of this frame.
Counter reset at	Show the time and date of the last time the switch was reset.
CRC errors	Number of invalid Cyclic Redundancy Check (CRC) frames detected.
Delimiter errors	Number of delimiter errors detected. Delimiters, such as SOFc3 (start of frame, class 3), EOFn (end of frame), or others, are improper or invalid.
Discarded frames	Number of class 2 and class 3 sequences that were discarded by this port. A sequence can be discarded because of detection of a missing frame (based on SEQ_CNT), detection of an E_D_TOV timeout, receiving a reject frame, receiving frames for a stopped sequence, or other causes.
Elapsed since counter reset	Length of time that has elapsed since the last switch reset was performed.
In frames	Number of class 2 and class 3 frames received by this port.
Invalid tx words recv	Number of invalid transmission words detected during decoding. Decoding is from the 10-bit characters and special K characters.
Laser Faults	Number of times a laser fault was detected.
LIF Flow Cntrl Errors	This is a switch internal error condition (for factory use only).

(Sheet 1 of 3)

Table A-1 Counter Names and Descriptions (port display window) (Continued)

Counter Name (in port display)	Description
Link failures	Number of optical link failures detected by this port. A link failure is a loss of synchronization for a period of time greater than the value of R_T_TOV or by loss of signal while not in the offline state. A loss of signal causes the switch to attempt to re-establish the link. If the link is not re-established by the time specified by R_T_TOV, a link failure is counted. A link reset is performed after a link failure.
Link reset in	Number of link reset primitives received from an attached device.
Link reset out	Number of link reset primitives sent from this port to an attached port.
LIP AL_PD AL_PS	Number of F7, AL_PS LIPs, or AL_PD (vendor specific) resets, performed.
LIP during Init	Number of times the switch received a LIP while it was already in the initialization state.
LIP F7 AL_PS	This LIP is used to reinitialize the loop. An L_port, identified by AL_PS, may have noticed a performance degradation and is trying to restore the loop.
LIP F7F7	A loop initialization primitive frame used to acquire an AL_PA
LIP F8 AL_PS	This LIP denotes a loop failure detected by the L_port identified by AL_PS.
LIP F8F7	Currently not used
LIP Total Received	Number of loop initialization primitive frames received.
LISM Failed	The LISM primitive is used to select a temporary loop master for initialization. This counter shows the number of times the switch was unable to establish itself as the loop master.
LOF Timeout ELS	Currently undefined
LOF Timeouts	Number of times the switch was unable to transmit a frame within the R_T_TOV value.
Long Frame Errors	Number of times a frame longer than the maximum frame size was received.
Loss of Signal	Number of signal losses detected for this port.
OLS in	Number of offline sequences received. An OLS is issued for link initialization, a Receive & Recognize Not_Operational (NOS) state, or to enter the offline state.
OLS Out	Number of offline sequences issued by this port. An OLS is issued for link initialization, a Receive & Recognize Not_Operational (NOS) state, or to enter the offline state. The switch may issue an OLS to perform offline diagnostics or to power down.
OPN Returns	Number of times that a device on the loop didn't accept an open primitive. This usually indicates a device error.
Out frames	Number of class 2 and class 3 frames transmitted by this port
Protocol errors	Number of primitive sequence protocol errors. An error indicates that a sequence protocol violates the FC-2 signaling protocol.

Table A-1 Counter Names and Descriptions (port display window) (Continued)

Counter Name (in port display)	Description
Reject frames	Number of frames, from devices, that have been rejected. Frames can be rejected for any of a large number of reasons.
Reserved	N/A
Retry LIPs	Currently not used
Short Frame Errors	Number of times a frame shorter than 36 bytes was received.
Smoothing Overflow Errors	Number of times that a violation of FC rules on the incoming signal were detected. An example of a violation would be an insufficient number of idles were received between frames.
Sync Loss	Number of synchronization losses. Loss of synchronization is detected through reception of invalid transmission words on the port.
Sync losses 100 ms	Number of synchronization losses (>100 ms) detected by this port. A loss of synchronization is detected by receipt of an invalid transmission word.

(Sheet 3 of 3)

Table A-2 Counter Names and Descriptions (Faceplate window)

Counter	Description
COF CRC ASIC 0	Internal switch counter that tracks errors during frame outputs from the specified ASIC. A non-zero value may indicate an internal problem with the switch.
COF CRC ASIC 1	
COF CRC ASIC 2*	
COF CRC ASIC 3*	
COF Parity ASIC 0	Parity error detected during reading of the frame in the CPORT Out FIFO (COF) for the specified ASIC. A non-zero value may indicate an internal problem with the switch.
COF Parity ASIC 1	
COF Parity ASIC 2*	
COF Parity ASIC 3*	
Frame bus Errs ASIC 0 Port 1	Errors detected in the data being sent over the frame bus between ASICs. A non-zero value may indicate an internal problem with the switch.
Frame bus Errs ASIC 0 Port 2	
Frame bus Errs ASIC 0 Port 3	
Frame bus Errs ASIC 0 Port 4	
Frame bus Errs ASIC 1 Port 1	
Frame bus Errs ASIC 1 Port 2	
Frame bus Errs ASIC 1 Port 3	
Frame bus Errs ASIC 1 Port 4	
Frame bus Errs ASIC 2 Port 1*	
Frame bus Errs ASIC 2 Port 2*	
Frame bus Errs ASIC 2 Port 3*	
Frame bus Errs ASIC 2 Port 4*	
Frame bus Errs ASIC 3 Port 1*	
Frame bus Errs ASIC 3 Port 2*	
Frame bus Errs ASIC 3 Port 3*	
Frame bus Errs ASIC 3 Port 4*	

* Only available for switches with more than 8 ports.

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Table A-2 Counter Names and Descriptions (Faceplate window) (Continued)

Counter	Description
Internal Parity ASIC 0 Port 1	Parity error detected with data transfer internal to the switch. A non-zero value may indicate an internal problem with the switch.
Internal Parity ASIC 0 Port 2	
Internal Parity ASIC 0 Port 3	
Internal Parity ASIC 0 Port 4	
Internal Parity ASIC 1 Port 1	
Internal Parity ASIC 1 Port 2	
Internal Parity ASIC 1 Port 3	
Internal Parity ASIC 1 Port 4	
Internal Parity ASIC 2 Port 1*	
Internal Parity ASIC 2 Port 2*	
Internal Parity ASIC 2 Port 3*	
Internal Parity ASIC 2 Port 4*	
Internal Parity ASIC 3 Port 1*	
Internal Parity ASIC 3 Port 2*	
Internal Parity ASIC 3 Port 3*	
Internal Parity ASIC 3 Port 4*	
Intr low Bufs ASIC 0	Number of times a low buffer condition has occurred on the specific ASIC.
Intr low Bufs ASIC 1	
Intr low Bufs ASIC 2*	
Intr low Bufs ASIC 3*	
Out of buffers	No large or small buffers were available to store a frame destined for the switch.
Out of s-buffers	No small buffers were available to store a frame destined for the switch.
Switch resets	Number of times the switch has been reset since it was manufactured.

* Only available for switches with more than 8 ports.

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Notes

Glossary

Administrator

A user of the switch management program who can define switch parameters, but not user access.

Address Resolution Protocol

A protocol that enables systems to query the network to identify devices by internet address.

AL_PA

Arbitrated Loop Physical Address

Arbitrated Loop

A Fibre Channel topology where ports use arbitration to establish a point-to-point circuit.

Arbitrated Loop Physical Address (AL_PA)

A unique one-byte valid value assigned during Loop Initialization to each NL_Port on a Loop.

ARP

Address Resolution Protocol

ASIC

Application Specific Integrated Circuit

BootP

A type of network server.

Broadcast Zone

A group of ports that determine the recipient devices for broadcast messages.

Buffer Credit

A measure of port buffer capacity.

Class 2 Service

A service which multiplexes frames at frame boundaries to or from one or more N_Ports with acknowledgment provided.

Class 3 Service

A service which multiplexes frames at frame boundaries to or from one or more N_Ports without acknowledgment.

COF

CPORT Out FIFO

CPORT Out FIFO (COF)

A switch output buffer.

CRC

Cyclic Redundancy Check

Cyclic Redundancy Check (CRC)

A method of detecting small changes in blocks of data.

Ethernet Activity LED

A switch management connector LED that indicates when data is being transmitted to and from the Management Workstation.

Ethernet Link Status LED

A switch management connector LED that indicates an active link with the Management Workstation.

Fabric Name

User defined name associated with the file that contains user list data for the fabric.

Fan Fail LED

An LED that indicates that a cooling fan in the switch is operating below standard.

FC-PLDA

Fibre Channel Private Loop Direct Attach

Flash Memory

Memory on the switch that contains the chassis control firmware.

FLS

Fabric loop switch.

Frame

Data unit consisting of a start-of-frame (SOF) delimiter, header, data payload, CRC, and an end-of-frame (EOF) delimiter.

FRU

Field Replaceable Unit

GBIC

GigaBit Interface Converter

GigaBit Interface Converter (GBIC)

A device, inserted into the switch chassis port, containing the transmitters and receivers that connect to the interconnection media.

Guest

A user of the switch management program who can view switch operations, but has no authority to define switch parameters or user access.

Hard Zone

A group of ports that provide access security by allowing communication only among hard zone member devices.

Heartbeat LED

An LED that uses blink patterns to indicate the status of the internal switch processor and the results of the Power-On-Self-Test.

Initiator

The device that initiates a data exchange with a target device.

In-Order-Delivery

A feature that requires that frames be received in the same order in which they were sent.

Input-Output Transfer

A switch stage type that enables the switch ports to connect to public devices, private devices, and other switches.

IO/T

Input-output transfer

IP

Internet Protocol

LIP

Loop Initialization Primitive Sequence

Logged-In LED

A port LED that indicates device login or loop initialization status.

Loop Initialization Primitive Sequence

A series of commands that initializes a loop of devices connected to a fabric.

Management Information Base

A set of guidelines and definitions for the Fibre Channel functions.

Management Workstation

Unix workstation from which the switch is managed.

MIB

Management Information Base

NL_Port

Node Loop Port. A fibre channel device port that supports arbitrated loop protocol.

Non-Volatile Random Access Memory

Memory on the switch where configuration information is stored.

N_Port

Node Port. A fibre channel device port in a point-to-point or fabric connection.

NVRAM

Non-Volatile Random Access Memory

Over Temperature LED

An LED that indicates that air temperature inside the switch has exceeded a preset limit.

POST

Power-On-Self-Test

Power-On-Self-Test (POST)

Diagnostics that the switch chassis performs at start up.

Private Device

A device that can communicate only with other devices on the same loop.

Private Loop

A loop of private devices connected to a single switch port.

RARP

Reverse Address Resolution Protocol

Reverse Address Resolution Protocol

A protocol that enables systems to query the network to identify devices by their MAC address

SANsurfer

Web-based switch management application.

Segmented Loop

A set of private loops that behave as one private loop.

SL_Port

Segmented Loop Port. A port connected to a private loop of devices.

SL_Port Zone

A set of SL_Ports and their connected devices that behave as a single private loop.

SNMP

Simple Network Management Protocol

Stage Type

A parameter that determines how the ports of a switch are configured.

Switch Logic Power Good LED

An LED that indicates when power is being supplied to the switch.

Switch Management Connector

A connector port on the switch that provides Ethernet access for the Management Workstation.

Switch Name

User defined name for a switch

Super User

A user of the switch management program who has authority to define switch parameters and user access.

Target

A storage device that responds to an initiator device.

T_Port

Trunk port. A switch port that connects to another switch.

TL_Port

Translated loop port. A switch port that serves as a proxy enabling private devices to communicate with public devices.

Traffic LED

A port LED that indicates when frames are entering or leaving the port.

Update Flash

The act of loading switch firmware.

Trunk Port

See T_Port.

VCCI

Voluntary Control Council for Interference

World Wide Name (WWN)

A unique 64-bit address assigned to a device by the device manufacturer.

WWN

World Wide Name

Zone

A set of ports or devices that have been grouped together to control the exchange of information.

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